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ARTERIAL STREETS PLAN

BOZEMAN, MONTANA, PLANNING AREA

April 1967

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Seattle, Washington

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ARTERIAL STREETS PLAN Bozeman, Montana

SETTING THE GOALS

The Historic Street and Traffic Problem

The street system in Bozeman basically faces the same problems common to cities across the United States. The streets were developed originally as local access streets serving the land uses along them. In early subdivision plats, streets were designed only with regard to serving uses within the subdivision, and little thought was given to tying the streets in to the existing system, nor to the effect of increased traffic on the surrounding streets. Horse and buggy traffic was slow and the gridiron street pattern, while not the best even for pre-automobile traffic, presented few difficulties to moving traffic. If the gridiron pattern had been evenly and consistently applied, traffic problems would be fewer today. Breaks in the grid at Main Street created the jogs in many north-south streets which impede efficient traffic movement.

While street widths have changed very little since Bozeman's early days, the use of streets has changed a great deal. Main Street and a portion of North Seventh Avenue excepted, arterial street capacity in Bozeman has not been appreciably enlarged since the arrival of the automobile. In many places it has actually become smaller. Unlike a water line which retains the capacity to carry a certain amount of water, regardless of use, the capacity of a street can be appreciably lowered by increasing use. Demands for parking, curb cuts for access to adjacent land uses, stop signs and signalization required to regulate increasing numbers of vehicles and the conflict between cars and pedestrians all lower the capacity of a street. Even today, because of the high cost and many variables which are difficult to predict, adequate provision for future traffic needs is seldom provided in the platting or construction of new streets.

With only a small amount of public transportation in the state, Montana residents are very automobile oriented. Since World War II the number of vehicles has increased dramatically, and at a rate greater than increases in population. Because of its proportionately large and rapidly increasing number of young people, Bozeman will experience large increases in the number of automobiles in the future. Plans must be formulated which anticipate future pressures on street use and allow

the circulation system to absorb and channel future traffic volumes so that people and goods can be moved quickly, conveniently, safely and economically between all points within the city and the jurisdictional area.

Goals and Objectives

To be effective, the arterial system must provide maximum freedom of traffic movement with a minimum of interference to adjacent areas and land use activities. It should link areas of related functions within the community with each other and provide efficient connection with other areas of the county and the surrounding region. It should provide for the transport of people and goods by means appropriate to the nature of each trip.

Streets are also valuable to the physical environment for reasons which are not based on traffic movement; they provide a conduit for all utilities, light and air to adjacent buildings, opportunities for landscaping, and they may be used to define elementary school service areas, neighborhoods, business and industrial districts.

The Arterial Streets Plan for the Bozeman Planning Area seeks to accomplish the following goals or objectives:

1. Separate conflicting street functions. Fast traffic should be separated from slow traffic; moving traffic from parking and loading; pedestrian traffic from automobiles; commercial traffic from residential traffic, local from through traffic, etc.
2. Provide buffers between residential, commercial and industrial activities. Arterial streets should separate or isolate conflicting or incompatible land uses and activities from each other.
3. Through traffic should be routed around residential, commercial, and industrial areas for maximum safety and efficiency. Arterials should serve these neighborhoods and districts on the periphery rather than split them.
4. Arterials should work in harmony with other streets to form an integrated system or network. The city street system should be coordinated with the state and county systems.

5. Arterials should be integrated with other transportation networks and their terminals, so that conflicts between railroad trains, trucks, automobiles and pedestrians are reduced or eliminated.
6. Thoroughfares and streets should be classified and designed according to their function.
7. On major thoroughfares, intersections should be limited to the minimum number needed for accessibility and convenience.
8. Roadways should be planned so as to avoid creation of small pockets of land for which there is no suitable use.
9. Thoroughfares should be planned and improved to serve projected traffic needs.
10. Arterials should be planned to the best possible engineering standards and practice in order to assure effectiveness, safety, efficiency and economy.
11. Timing of arterial street improvements should be coordinated with other private and public improvements.
12. Arterial street improvements costs should remain within the community's ability to pay, making the most use of the traffic carrying capacity of present streets, to the extent not inconsistent with other goals.

THE ARTERIAL STREETS PLAN

Updating the Arterial Plan

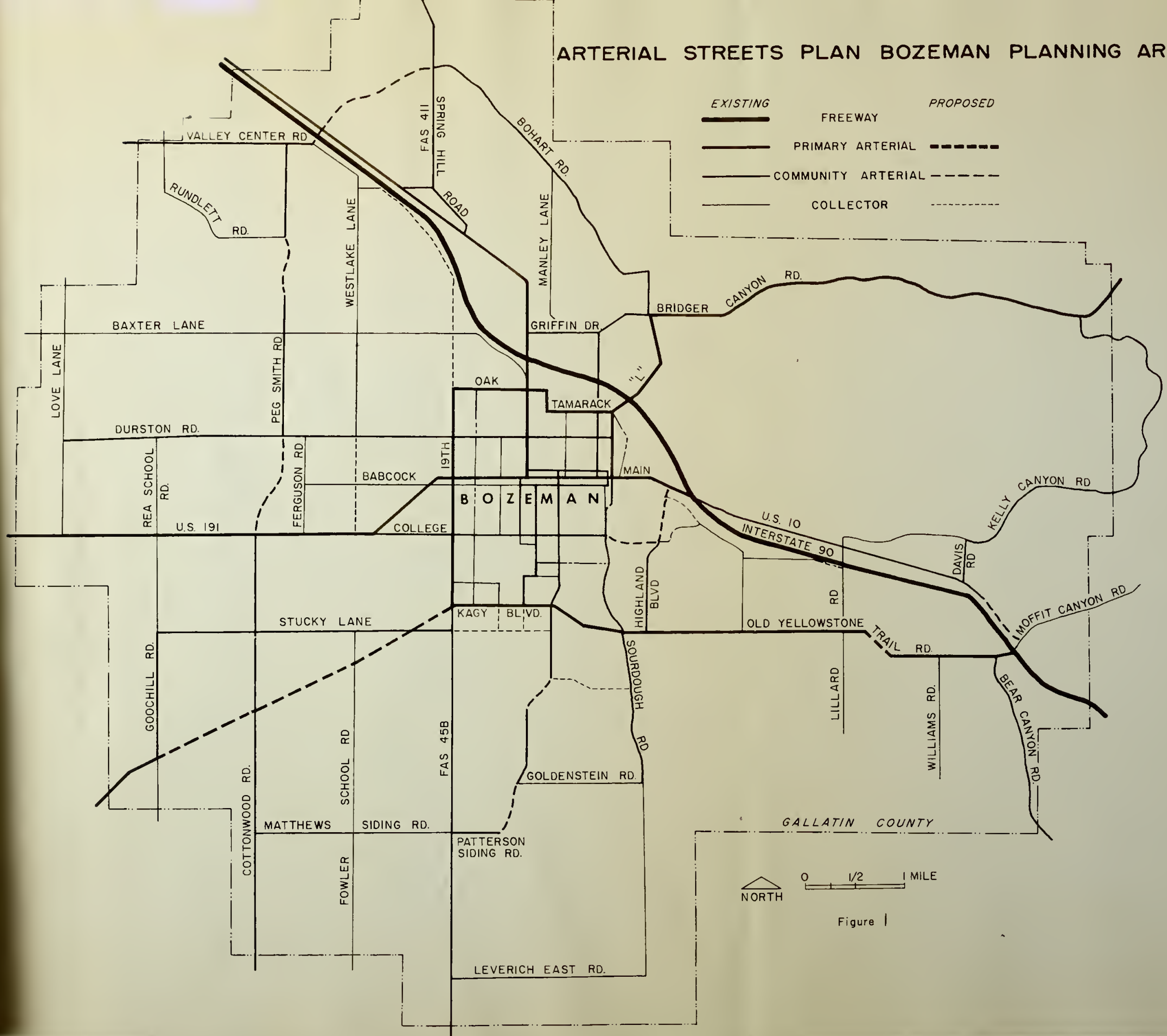
The arterial streets plan adopted by the Bozeman City Council in July 1958, was prepared by S. R. DeBoer & Company. A later review of the plan was made by L. C. Gerckins in 1960 and a new plan proposed, but never adopted. Both plans were examined in terms of estimated future traffic volumes and only those proposals in the previous plans which could be justified by foreseeable growth were considered for inclusion in this plan. Some proposals in each plan were found to be excellent. However, although the arterial plan proposed here incorporates these ideas, it is basically not a patchwork of previous plans, but the result of the independent analysis of existing land use, past and present traffic flows and forecasted volumes of future traffic.

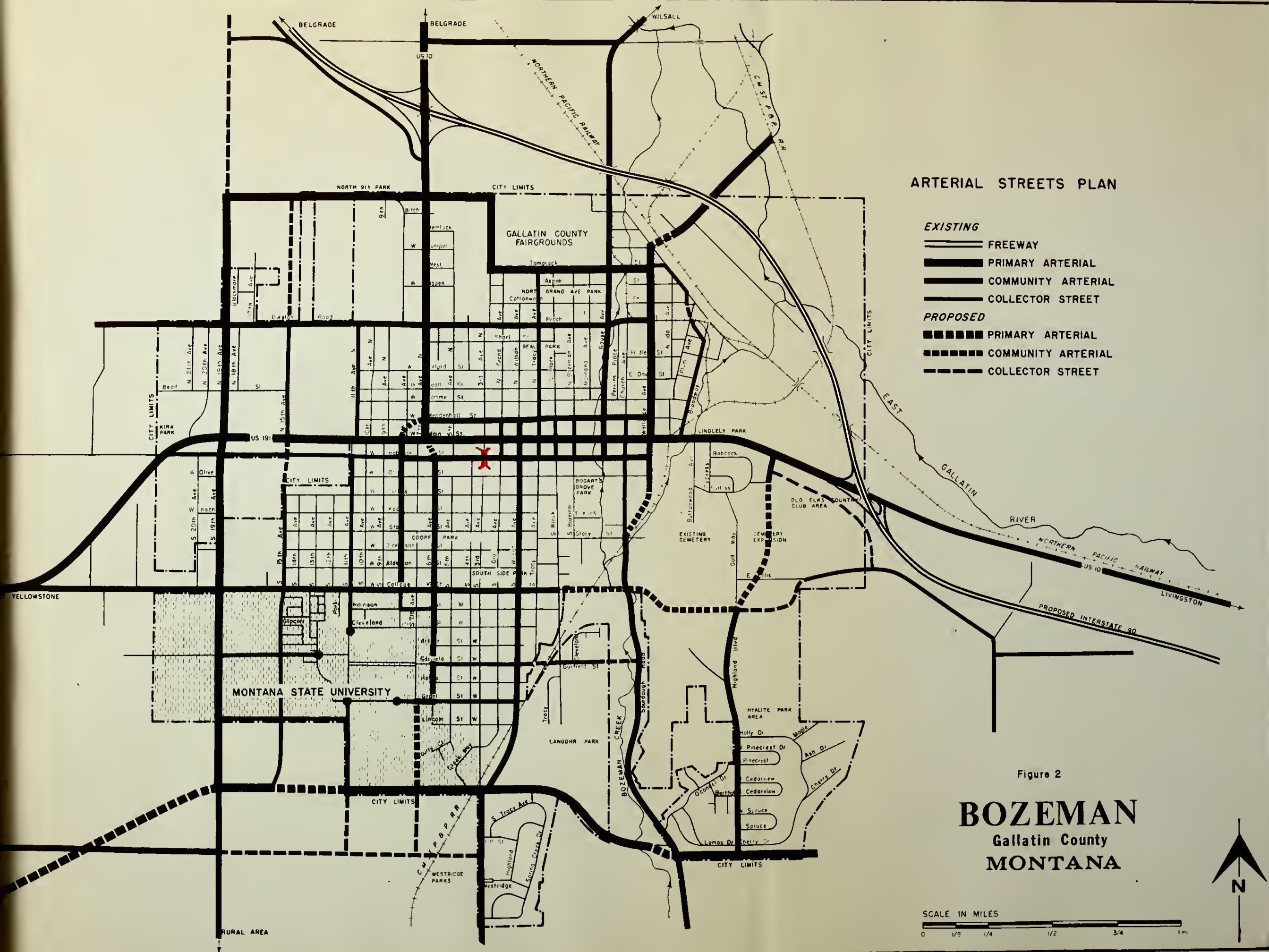
The Arterial Streets Plan

Planning for an arterial street system is not a simple matter. Volumes of information, described in this study, must be gathered and analyzed. In this analysis, problems are identified by the comparison of the amount of traffic forecasted with the capacities of the streets to handle the traffic. Where there is potential overload of vehicles, congestion and costly delays may be expected unless relief is provided. One way of relieving an excess of traffic is by increasing the street's capacity through widening or improvement such as has been done with Main Street and North Seventh, or by prohibiting parking to make full use of the street. The other way is by providing alternative routes which will take people where they want to go on other routes than the overcrowded streets.

The plan includes traffic engineering solutions which will make the best use of existing streets. It includes short-, intermediate- and long- range solutions to various problems. Basically, it proposes a complete system interlinking the freeway, major arterials, collector streets and local service streets. The complete system will not be in operation until it is completely constructed. However, the most essential elements of the system can be built first so that some relief can be provided as the plan is gradually put into effect. Proposals for implementation of the plan assume a certain amount of judgment about needs and financial capability.

ARTERIAL STREETS PLAN BOZEMAN PLANNING AREA





The Arterial Streets Plan for the Bozeman Planning Area is illustrated on two maps; Figure 1 shows the plan for the entire planning area and Figure 2 shows the portion of the plan within the city in greater detail. Four arterial street classifications are illustrated; freeways, primary arterials, community arterials, and collector streets. Local access streets are not illustrated on the plan, since the plan is for arterial streets only. The location of future local access streets is left to the subdivision designer.

In the following section, proposals for each of the major street classifications are discussed. A list of streets proposed for each category in the plan is included as Appendix A.

THE FREEWAY

Interstate 90 is the only freeway shown on the plan. When completed from the West interchange to the Bear Creek interchange it will provide some relief for Seventh Avenue and Main Street by removing the U. S. 10 through traffic these streets are presently carrying. Figure 3 shows Montana State Highway Commission projections of future traffic on the freeway, the West interchange with Seventh Avenue and the East interchange with Main Street. These forecasts show that almost one-half of the freeway traffic approaching Bozeman from the west and east and will continue to flow into or out of Bozeman rather than by-pass the city. In 1985, an estimated 4,330 vehicles per day will be using the freeway between the West and East interchanges. Although this traffic will be removed from city streets, it will not be a very significant amount in terms of the total traffic volumes expected on Main Street and Seventh Avenue by 1985.

PRIMARY ARTERIALS

Main Street

The Montana Highway Commission is committed to widening Main Street from Broadway to the East interchange with Interstate 90 to increase its capacity between the freeway and the central business district. Within the central business district there are several ways to increase the present capacity of Main Street without resorting to costly measures such as further widening. On an interim basis, parking could be prohibited between four and six P.M. from Rouse to Eighth

ESTIMATED 1985 AVERAGE DAILY TRAFFIC

INTERSTATE 90 AND EAST AND WEST INTERCHANGES AT BOZEMAN

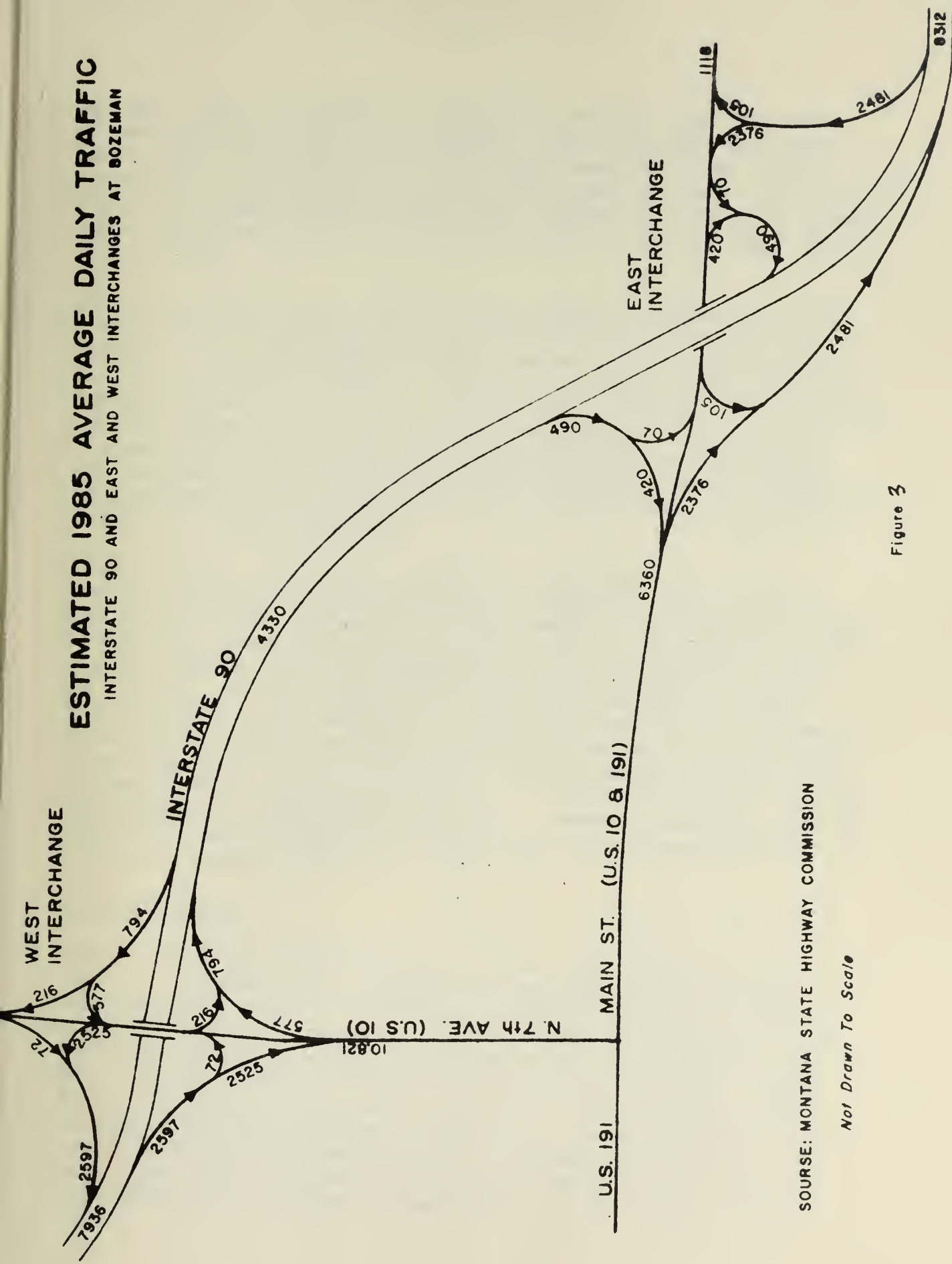


Figure 3

SOURCE: MONTANA STATE HIGHWAY COMMISSION

Not Drawn To Scale

Avenue. This would add an additional traffic lane in each direction during this peak period. Also, left turning movements could be prohibited during peak hours at some intersections. The provision of right turn storage lanes at Willson, Tracy and Rouse Avenues would also improve traffic flow along Main Street throughout the day although it would remove some curb parking.

Bus stops for the new transit line should be located on the far side of intersections in the CBD, or in the middle of blocks. In no case should bus stops be closer than 100 feet to the intersection ahead. On-street parking should be patrolled and violations ticketed consistently. Tires can be chalked to locate and ticket meter feeding violations. Unless parking regulations are enforced, illegal parking will occur in "No Parking" or "No Stopping" zones, employees will continue to feed meters, and the traffic control function of parking regulation will break down.

In the future, Main Street cannot be expected to continue its dual function as both the major shopping street in Bozeman and the major east-west through route. The future volumes forecast for Main Street (given the present arterial system and the completion of Interstate 90) are much too large for it to carry without congestion and costly delays. A long term solution which shifts at least a portion of the projected Main Street volumes to other selected streets will be necessary to prevent severe congestion. The Arterial Streets Plan proposes such a long term solution, discussed under the following section on Community Arterials. However, a more detailed downtown plan is needed to provide for off-street parking and other elements of a real solution.

Wallace Avenue

Rouse Avenue presently carries Bridger Canyon Road traffic into the Bozeman CBD. Although it has the capacity to carry expected 1985 volumes, there is no possibility for a future grade separation between Rouse Avenue and the Northern Pacific Railroad main line, because Interstate 90 will overpass both Rouse Avenue and the railroad at their intersection. Therefore, a long range proposal is made to remove Bridger Canyon traffic from Rouse Avenue and shift it to Wallace Avenue via the "L" Street underpassing of the freeway. This will entail construction of an overpass over the Northern Pacific main line at "L" Street and upgrading of "L" Street to the

Bridger Canyon Road. This primary arterial route will provide a direct and safe connection to the northern section of the outer ring road. This is a low priority project since it will not be needed until after 1985.

Future Alternate to U. S. 191

Another long range proposal is shown on the Arterial Plan that would connect the intersection of Nineteenth and Kagy Boulevard to the existing Goochill Road which runs diagonally to Gallatin Gateway from the west jurisdictional area limits. This proposal would remove much of the U. S. 191 through traffic, particularly traffic from Yellowstone National Park, from Main Street and the central business district. It would provide a connection to the West interchange of Interstate 90 via Nineteenth Avenue and Oak Street and to the Bear Creek interchange of Interstate 90 via Kagy Boulevard. The route is shown only in a very schematic way, but has been included to show the long range need for a U. S. 191 by-pass route.

Other Primary Arterials

U. S. 191 west of Main Street, North Seventh Avenue and U. S. 10 to Belgrade are also designated primary arterials, in continuation of their present function. Widening of three blocks of North Seventh Avenue will be necessary to accommodate expected 1985 volumes. The present 100 foot right of way north of Beall Street is constricted to 57 feet between Beall and Main Streets, although this portion of North Seventh carries the greater volume of traffic.

Circumferential Route

A circumferential primary arterial route, or inner ring road, is proposed south of the Interstate 90 freeway, around the northern, western, and southern portions of the city. This is one of the most important proposals in the plan. Its purpose will be to bypass through traffic around the city, provide an alternative faster flowing route between various sections of Bozeman and increase accessibility to developing areas in the community. This circumferential route incorporates Tamarack Street, Third Avenue and Oak Street on the north, Nineteenth Avenue on the west, and Kagy Boulevard on the south. This will require bringing the rights of way of the existing portions of this route up to a minimum width of 90 feet. The missing link in Kagy Boulevard between South Eleventh and South Fifteenth Avenues will have to be constructed, and

two jogs in Kagy Boulevard, at Sourdough Road and between Lillard and Williams Roads, should be eliminated. The extension of Kagy Boulevard along the Old Yellowstone Trail Road to the Bear Creek interchange of Interstate 90 effectively adds a third freeway interchange to the arterial system serving Bozeman, and one which provides the most direct connection from the east to Montana State University and South Bozeman. It should be emphasized that the inner ring road offers a great opportunity for development as a parkway and it is recommended that sufficient right of way be acquired for its eventual accomplishment. Parkway development would greatly enhance the areas adjacent to Nineteenth Avenue and Kagy Boulevard.

COMMUNITY ARTERIALS

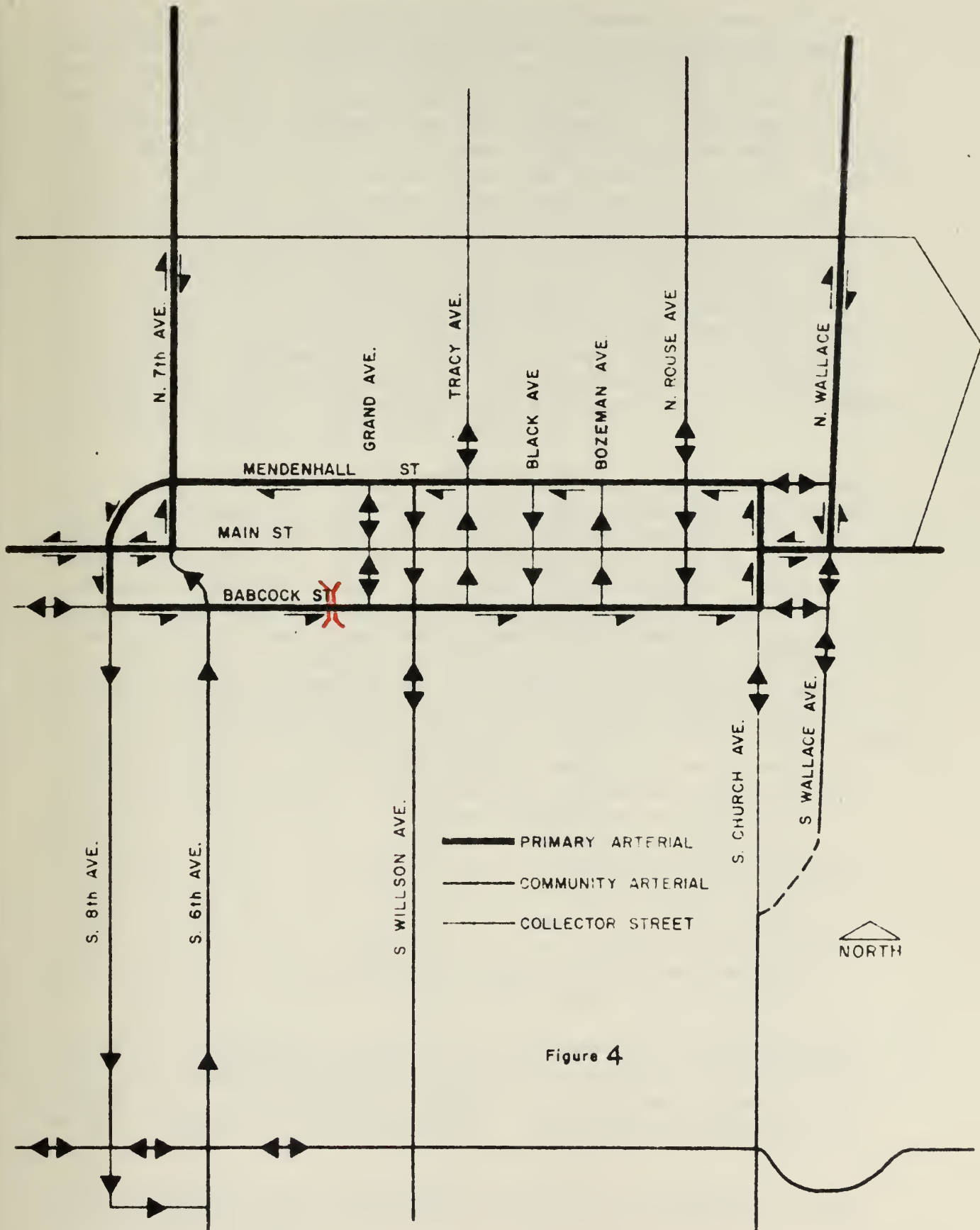
One-way Couplets

The one-way street pattern offers a number of advantages. It separates opposing streams of traffic, increases the capacity of a street, makes turning movements easier and safer by reducing conflicts at intersections and mid-block, allows passing of slower vehicles, and increases the average vehicular speed. These advantages more than compensate for the slightly longer distance one-way streets sometimes require motorists to travel to get to their destinations.

Figure 4 illustrates the one-way couplets proposed to relieve Main Street congestion in the CBD and around the intersection with North Seventh Avenue. Traffic now carried on South Eighth Avenue, Main Street, and from North Seventh Avenue will be dispersed to two intersecting one-way couplets. The first will utilize Mendenhall and Babcock from Church to Eighth Avenues, and the second will utilize Sixth and Eighth Avenues from Mendenhall to Harrison Streets. One-way movement will be in counterclockwise direction in both couplets. The problem of left turning movements against opposing traffic into the Central Business District from Mendenhall and Babcock is resolved by designating Willson, Tracy, Black, Bozeman, Rouse and Church Avenues one way between Mendenhall and Babcock Streets. These one-way cross streets in the CBD will also help to diminish any "pile up" on Babcock at the eastern terminus of the CBD couplet.

Traffic that is bound to or through the CBD will be encouraged to use Mendenhall and Babcock as alternates to Main through

ONE WAY COUPLETS



(1) signs which will direct traffic to these streets, (2) the provision of adequate off street parking along Mendenhall and Babcock, and (3) signalization designed to speed the traffic flow on Mendenhall and Babcock. Eastbound traffic approaching Bozeman from the west on U. S. 191 could be shuttled onto Babcock at the west city limits, or onto College Avenue to bypass the central business district entirely. Community residents would soon learn that travel times would be shorter on the one-way streets, and would use them because they are more convenient. Mendenhall Street is presently over 90 percent of capacity from Third to Rouse Avenues during peak hour. To an extent Mendenhall is already used as a bypass to Main Street. Change to a one-way community arterial will increase its capacity by providing an additional moving lane and doing away with left turns against opposing traffic. However, restrictions on parking will also be needed by 1985 at least during peak hours.

The designation of Babcock Street as a one-way community arterial will greatly increase the amount of traffic on Babcock passing the Willson and Emerson elementary schools and the Rosary grade school, which are clustered around the intersection of Babcock Street and South Third Avenue. In the long run it will be desirable to relocate these schools in more desirable locations away from these heavily traveled streets. In the interim, a pedestrian bridge over Babcock Street at South Third Avenue is proposed to provide a safe crossing of Babcock Street for the children, while permitting free flow of traffic along the street. The one-way pattern around the central business district with adequate parking supplied along Babcock and Mendenhall Streets will help the downtown business man. With the reduction in traffic congestion, with its delays and inconvenience, more people in the trading area of Bozeman will be induced to come downtown to shop, and they will spend more. Through traffic which will be diverted away from Main Street by the one-way streets and by the freeway, represents no local expenditure except gas and motel. Therefore, it is the improvement of convenience to the local customer that means improved trade.*

The one-way couplet connecting the Montana State University with the downtown area will accommodate future traffic flows adequately. South Eighth Avenue will continue to be the major approach to the University. South Sixth Avenue will

* "Do By-Passes Hurt Business?" Chamber of Commerce of the U. S. Publications

ONE-WAY COUPLETS DETAIL

- NEW CONSTRUCTION
- ▤ STREET CLOSURE
- TRAFFIC LIGHT
- STOP SIGN

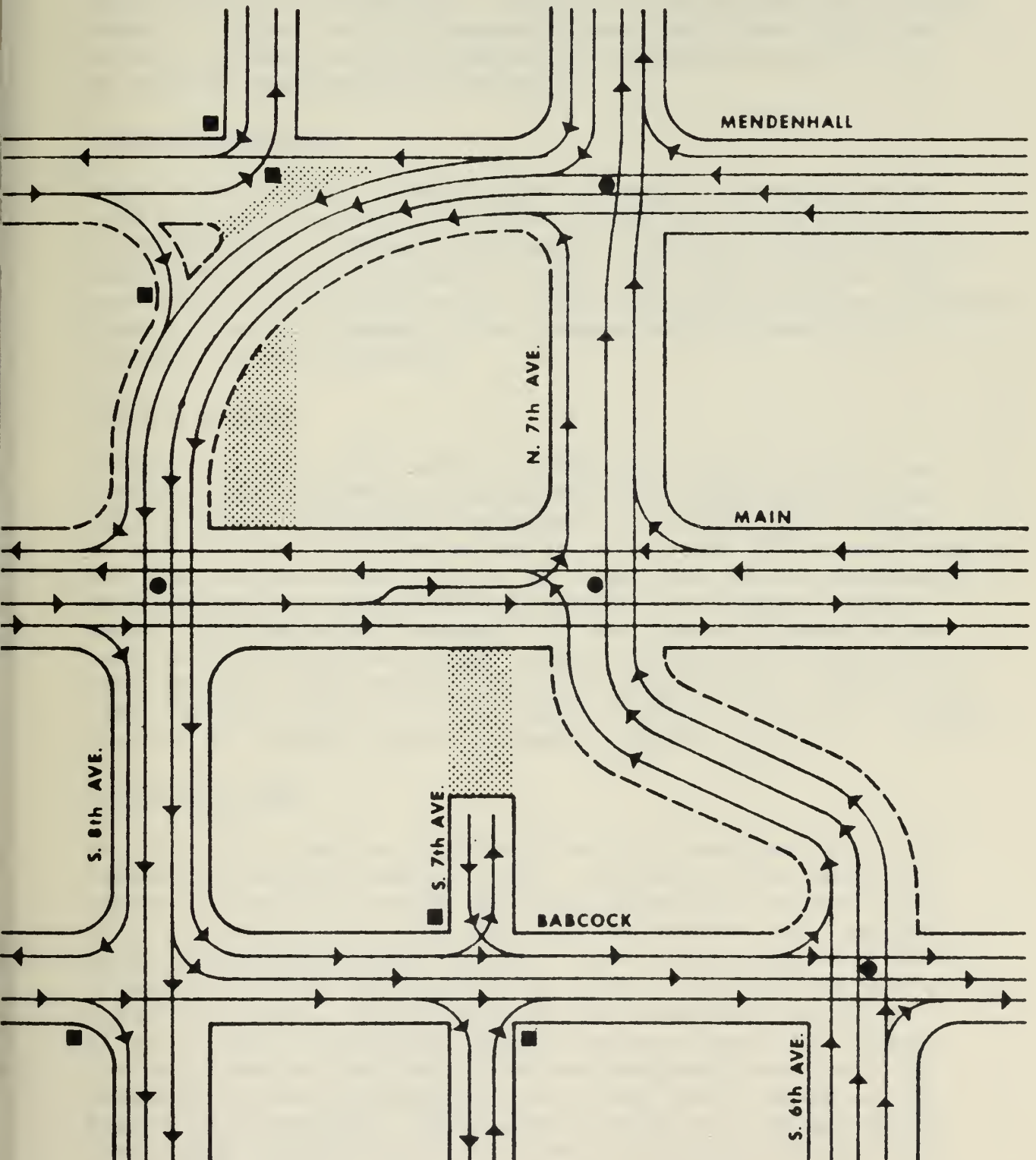


Figure 5

be a northerly continuation of the eastern circumferential arterial around the University. A more detailed sketch of the intersection of these two couplets with Main and Seventh is illustrated on Figure 5. This sketch shows how traffic flows could be channelized. Turns will be allowed only where shown. Certain turning movements onto Main from Eighth and Seventh Avenues will be prohibited to encourage greater use of Babcock and Mendenhall Streets.

Highland Boulevard

Highland Boulevard is designated a community arterial from Kagy Boulevard north to Harrison Street and a new northerly extension of Highland Boulevard is proposed following the swale from Harrison Street to meet U. S. 10 at a point just west of the east interchange. This route will provide a connection from south Bozeman to the freeway which bypasses the central business district.

College Street

College Street is designated a community arterial from its intersection with West Main Street (U. S. 191) west of the city limits, to Highland Boulevard at the east city limits. It will follow the existing right of way west of Bozeman Avenue, but will require construction of a new road across Sourdough Road, swinging south to Harrison Street to Highland Boulevard. This important proposal in the plan will provide the much needed cross-town route passing Montana State University and will also provide an alternative route, located away from the CBD, for U. S. 191 through traffic. It will, however, connect to several arterials leading to the CBD.

Outer Ring Road

An outer ring road is proposed from the intersection of "L" Street and Bridger Canyon Road, circling to the north of the golf course on Bohart Road, and connecting to McGinley Road via the freeway underpass west of Bozeman and continuing south on McGinley Road, Peg Smith Road, and Cottonwood Road. Construction will be required to fill in several gaps in the outer ring road. These gaps are (1) from Cottonwood Road at U. S. 191 to Peg Smith Road at Durston Road, (2) between the north end of Peg Smith Road and McGinley Road, and (3) between the freeway underpass at Valley Center Road and Bohart Road at FAS 411. This route, which is a comparatively long range proposal, will make areas of future residential

development more accessible, and provide a unifying connection between the northern and western portions of the jurisdictional area split by the Interstate 90 freeway.

Rouse Avenue

Rouse Avenue has the capacity to carry expected 1985 traffic from Mendenhall north without difficulty. However, from Main to Mendenhall Streets, traffic control measures may be necessary to increase the capacity of Rouse Avenue before the proposed one-way couplet system is instituted. The restriction of parking along the west side of Rouse Avenue at the southbound approaches to Mendenhall and Main streets will allow for right turning movements without blocking through traffic lanes. Although Rouse Avenue is presently a primary arterial, it will become a community arterial when "L" Street takes over its function of carrying Bridger Canyon Road traffic sometime after 1985.

Willson Avenue

Willson Avenue is proposed as a community arterial from Mendenhall to Hyalite Road. It is recommended that two jogs be removed, the first between Willson and Third Avenue South Road, and the second between Third Avenue South Road and Patterson Siding Road. The removal of the latter jog will eliminate two grade crossings of the Milwaukee railroad line as well as provide a safer and straighter road.

Wallace Avenue - South Church Avenue - Sourdough Road Arterial

In order to provide a north-south cross-town arterial on the east side of Bozeman, a short new road paralleling the north side of the Milwaukee railroad line is proposed to connect South Wallace Avenue with South Church Avenue (Sourdough Road). This community arterial, coupled with the North Wallace Avenue primary arterial, will supply a convenient north-south arterial route at the east end of the CBD.

Other Community Arterials

A number of other existing roads are designated community arterials to complete the system. These include - Valley Center Road west of the freeway underpass; Bear Canyon Road; Kelly Canyon Road; Old U. S. 10 between the East and Bear Creek interchanges with Interstate 90; Hyalite Road south of Kagy Boulevard; Stucky Lane; Goochill Road south of Stucky Lane; Durston Road from Love Lane to Wallace Avenue; Springhill Road; and Griffin Drive between U. S. 10 and Rouse Avenue.

COLLECTOR STREETS

Far fewer collector streets are shown in the proposed plan than in the Gerckins review of the DeBoer Plan. The system of collector streets proposed outside the city in the Gerckins plan could not be supported by the expected distribution of future population or traffic volumes until considerably after the year 1985. Furthermore, the possibilities for good subdivision design would be restricted by locating, at this time, all collector streets in areas of future growth. The location of future local access and collector streets can be controlled by the careful administration of a good subdivision ordinance. This will require increasing awareness on the part of the planning board, in future review of subdivision plats, of the implication of a plat on the street system, and an insistence by the Board on good circulation planning.

Many of the traffic problems caused by the present layout of platted streets in Bozeman, particularly the jogs in north-south streets, could have been avoided. It is recommended that the City-County Planning Board pay special attention to proposed circulation patterns in all new subdivisions and to the relationship between traffic generated by the subdivision and its effect on the surrounding arterial streets, not only at the time of platting, but with consideration to future development in the surrounding area. As a general rule, each quarter square mile of new development should have a collector carrying traffic to the major arterial system with a minimum 60 foot right-of-way. Proposed collector streets within Bozeman include Fifteenth Avenue from Kagy Boulevard to Oak Street, Eleventh Avenue from College Street to Babcock Street and from Main Street to Durston Road. The Eleventh Avenue collector is broken between Babcock and Main Streets in order to discourage north-south traffic past the junior and senior high schools. Tracy Avenue is designated a collector between Babcock and Tamarack Streets to serve the residential areas north of the CBD. Several collector streets will serve the Montana State University area; Garfield and Lincoln Streets west of the new dormitories; Grant Street from South Sixth to Willson Avenues; Garfield from South Sixth Avenue to Sourdough Road; and three streets around the relocated stadium south of Kagy Boulevard.

A collector for truck traffic in the industrial area in northeastern Bozeman is proposed from Tamarack Street at Wallace Avenue, via Tamarack, Front, Avocado and Broadway to East

Main Street. This collector will connect the northern portion of the inner ring road with U. S. 10 thus providing truck access to the industrial area from both the East and West Interstate 90 interchanges while avoiding the most heavily traveled city streets.

A collector is proposed from Harrison and Highland Boulevard to Ellis Avenue and along Ellis Avenue to Lillard Road. This collector will serve the proposed Elks Country Club Park. The Montana Highway Commission is now studying the location of the freeway frontage road which will connect Ellis Avenue to U. S. 10. We recommend that the frontage road tie into the proposed Highland Boulevard extension south of East Main Street so as to eliminate one additional intersection with East Main.

Three collectors among those designated in the planning area outside Bozeman will require new construction. These are: (1) a new road between South Willson Avenue and Sourdough Road, at the southern edge of the golf course south of Ragy Boulevard, (2) a southerly extension of Westlake Lane from Baxter Lane to U. S. 191, and (3) a northerly extension of Nineteenth Avenue from Oak to the freeway and then a frontage road to the northwest to the existing frontage road.

FUTURE MONTANA STATE UNIVERSITY TRAFFIC

Montana State University has prepared plans for future student housing developments and pedestrian circulation on the campus that will have a considerable effect on traffic flow to and around the University in the years to come. At the present time, Cleveland, Garfield and Grant Streets are open to vehicular traffic across the campus from Sixth to Eleventh Avenues and Eleventh Avenue traverses the campus from north to south. Present University plans call for the closure of these streets as through streets within the campus boundary. The role of these streets on campus in the future will be only for access to parking lots located around the periphery of the campus. Instead of the present pattern of traffic flowing into and through the campus, future traffic will be directed around the campus. University traffic will increase greatly toward the western end of the campus with the development of 900 units for married student housing between Fifteenth and Nineteenth Avenues South of College Street replacing those presently located between Eleventh and Fifteenth Avenues. Additional high rise dormitories are planned for the area west of Eleventh Avenue in the vicinity of the present high rise dormitories. A large parking lot is planned for the area west of Fifteenth Avenue, west of the high rise dormitories and south of the proposed married students housing to serve both these University residential uses.

To distribute traffic around the perimeter of the University campus, a set of circumferential arterials is proposed. As illustrated on Figure 2, this campus loop will incorporate College Street on the north, Ragy Boulevard on the south, Nineteenth Avenue on the west, Sixth Avenue on the east from College Street to Grant Street, Grant Street from Sixth to Seventh Avenues, and Seventh Avenue from Grant Street to Ragy Boulevard. To link this circumferential arterial loop to freeway interchanges and other parts of Bozeman, Nineteenth Avenue will be extended to the north as a primary arterial to connect with the West freeway interchange via Oak Street, and Ragy Boulevard will be extended as a primary arterial to the east to connect to the Bear Creek interchange. College Street will be extended to the east across Sourdough Road on a new road to connect to U. S. 10 and the east freeway interchange via the relocated northern portion of Highland Boulevard.

Two north-south streets will continue to traverse the campus, Fifteenth and Nineteenth Avenues. Several collector streets are proposed in the vicinity of the University. Fifteenth Avenue is also proposed as a collector street from Kagy Boulevard to Oak Street and Eleventh Avenue is proposed as a collector from College Street to Labcock Street. Extensions of Seventh and Eleventh Avenues south of Kagy Boulevard are recommended to intersect with a proposed easterly extension of Stucky Lane from South Nineteenth Avenue to South Willson Avenue. These last three new streets would collect traffic from the University Research Park between the Milwaukee railroad and South Seventh Avenue, the relocated Gatten Field Stadium between Seventh and Eleventh Avenues south of Kagy Boulevard, and future residential development south of the University. Extensions of Seventh and Eleventh should be financed entirely by the University, while the Stucky Lane extension should be a joint MSU-County project.

The consultant concurs with the University's plans to close South Eleventh Avenue, Cleveland, Garfield and Grant Streets within the campus to through traffic. However, this should be done only after provision of adequate off street parking is made. These streets would still have to be available for delivery and emergency use. These proposed street closures not only will create a more pleasant and efficient environment for student pedestrian traffic, but will be necessary from a safety standpoint as well. Present enrollment and the number of student vehicles will more than double by 1985. Traffic movement on the campus would become impossibly congested if the existing streets were left open to through traffic because of the increasing conflicts between vehicles and pedestrians.

The net effect of the campus street closures, proposed new arterial and collector streets, and provision of new campus parking lots will be to change the current traffic patterns, which concentrate traffic around the northeast corner of the campus, particularly on Eighth Avenue, and disperse traffic more evenly around the campus. These changes should aid rather than hinder better traffic control.

Problem Intersection

At the present time a dangerous intersection is located at the south city limits, where Kagy Boulevard, South Third Avenue and Willson Avenue meet. The proposed street closures on the Montana State University campus and the resultant changing traffic patterns will shift much more traffic to this intersection in the future.

It is proposed that South Third Avenue be considered only as a local access street with its southern termination at Kagy Boulevard. In order to insure the local access character of the street, as much South Third Avenue through traffic as possible should be shifted to South Seventh or South Willson Avenues. This can be accomplished as illustrated in Figure 6 by allowing no access to South Third from Kagy Boulevard, and limiting the turning movements allowed from South Third Avenue to Kagy Boulevard to a right turn only. This will prevent traffic which wishes to go east on Kagy Boulevard or south on Willson Avenue from using South Third Avenue.

PROPOSED INTERSECTION

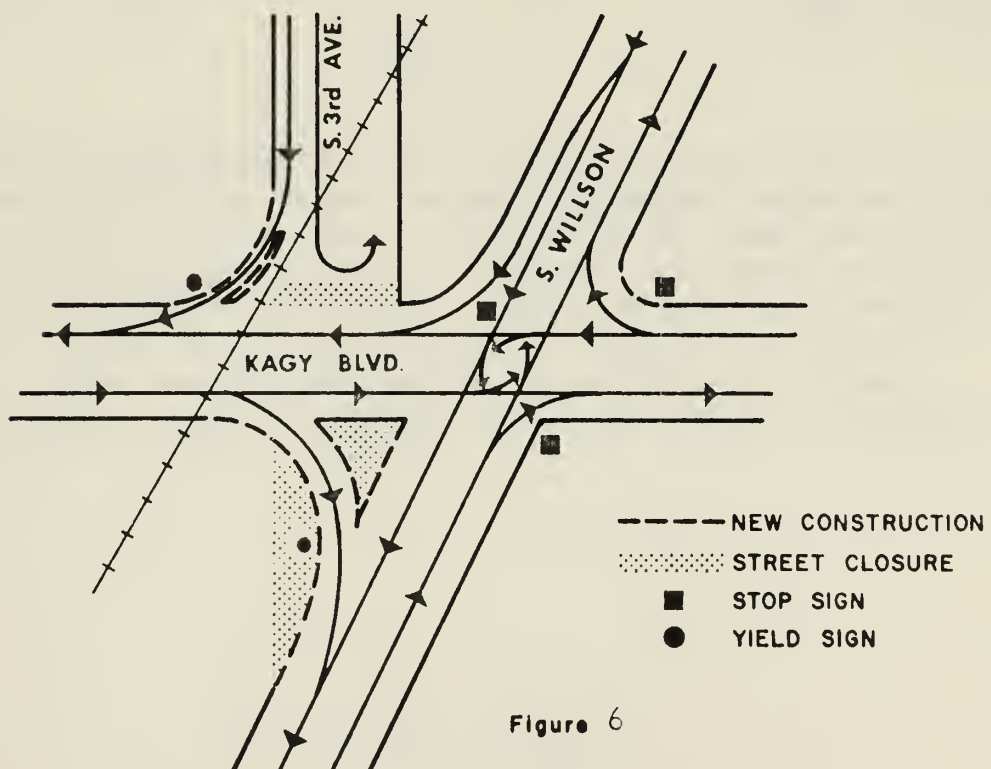


Figure 6

Design Standards

As a guide to subsequent implementation programs, design standards and right-of-way illustrations are provided below and on Figure 7.

RECOMMENDED THOROUGHFARE DESIGN STANDARDS

<u>Thoroughfare type</u>	<u>Right-of-way width</u>	<u>No. of moving traffic lanes</u>	<u>Median strip width</u>	<u>Traffic volume ADT</u>
Freeway	150'-400'	4-8	4'-80'	20,000-150,000
Primary arterial	90'-200'	4-6	20'-60'	Varies with function
Community arterial	80'-120'	4	0'-20'	1,000- 25,000
Collector	60'- 80'	2	0'	600- 1,500

The foregoing description of the Arterial Streets Plan proposal is based on traffic and street capacity studies depicted in the text and graphics that follow. The traffic studies provide the analysis of present and potential problems for which the plan is intended to provide solutions. These studies provide both the justifications for the Plan and the reasons for specific proposals. Thus, anyone interested in the Plan's why and wherefore should read the traffic and street capacity studies which follow.

RIGHT-OF-WAY ILLUSTRATIONS

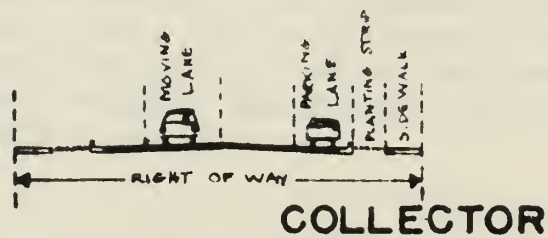
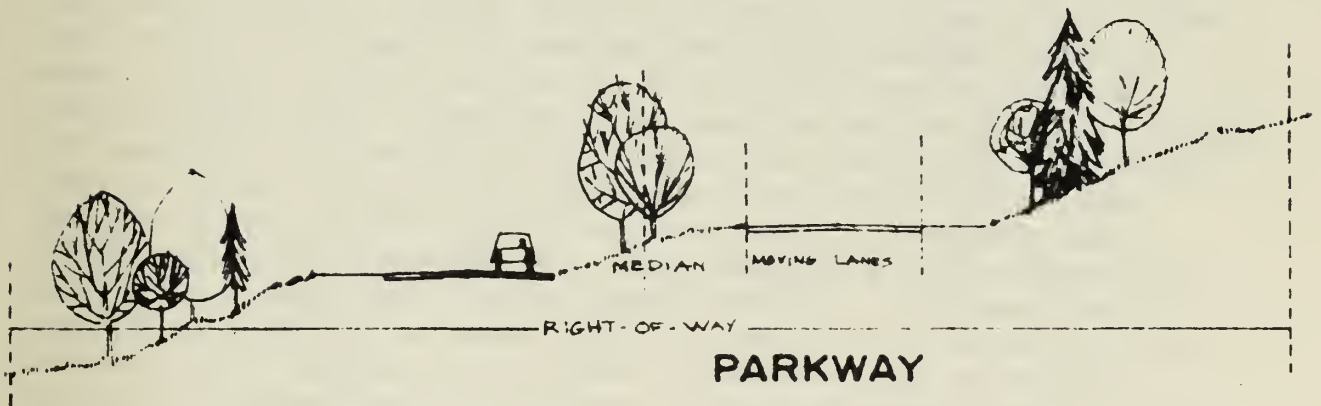
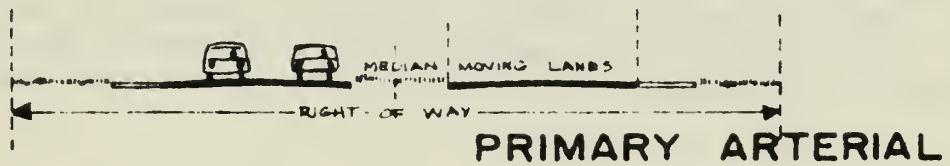
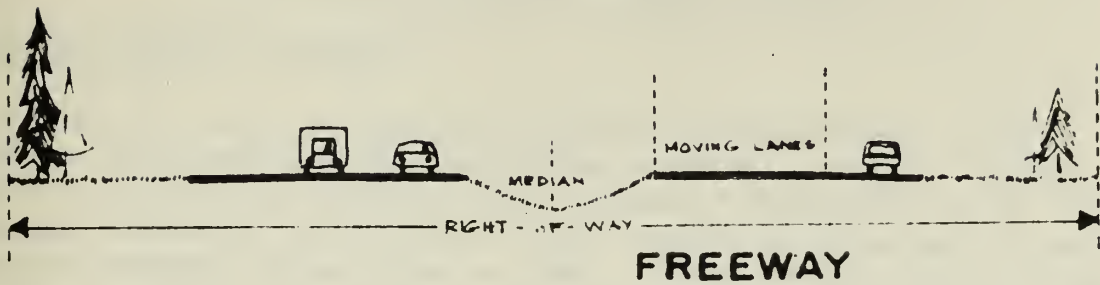


FIGURE 7

TRAFFIC AND STREET CAPACITY STUDIES

Present Traffic Volumes

In order to gain insight into present problems and to provide a basis for projecting future volumes, traffic counts were taken by the Montana State Highway Commission at 60 different locations selected by the consultant on major streets in the Bozeman urban area in 1966. These counts, which measured the number of cars, by hour, that passes a particular station, were taken for periods of at least 24 hours. Two sets of week-day counts were taken. Traffic was counted in August, to assess the influence of tourist traffic during the summer months, and in October, to determine the influence of Montana State University traffic during the remainder of the year.

These counts were converted to average daily traffic through the use of Montana State Vehicle Conversion Factors for August and October week days by the Montana State Highway Department. These factors are based on traffic flow patterns on an "average" city. However, the location of the rapidly growing Montana State University in Bozeman, and the resultant great variation in population between the nine-month school year and the summer months yield two distinctly different sets of average week-day traffic. Some startling differences between the summer and fall volumes occurred. October average daily traffic for some stations was more than double the August daily traffic at the same locations. No particular or special events were going on at the University during the October counts, and the counts were consistently high all over town, and not merely in the vicinity of the University.

In November 1966, recounts were taken at twelve stations which recorded extremely high counts in October, particularly those stations along Main Street. Without exception, average daily traffic volumes yielded by the November counts were considerably lower than the October volumes, due in part to snowy weather during the latter part of the November recount. Still, even the lower November counts were substantially higher than the summer counts on Main Street in the central business district, on North Seventh Avenue between Mendenhall and Main, and at two stations on South Eighth Avenue.

Unless the summer school program at Montana State University expands more rapidly than the regular school year program, this seasonal variation in traffic can be expected to be even greater in the future, as University enrollment is increasing at a faster rate than the non-school population in Bozeman.

Previous Traffic Counts

Traffic counts had also been taken by the Montana Highway Commission in May 1966 at a number of locations along Main Street and Seventh Avenue, the major highway routes through Bozeman, and along Eighth Avenue, the most heavily traveled route from Main Street to Montana State University. Thus, for seven count stations in Bozeman, four different 1966 average daily traffic volumes were available. Average daily traffic data for 1948, 1953, 1956, and 1960 taken at count stations along major highways through Bozeman, were also examined. All relevant average daily traffic data are shown on Tables 1 and 2.

In analyzing past and present traffic flows in Table 1, the 1956 counts were not considered to be valid for analysis purposes. Due to adverse weather or some other unusual situation, the average daily traffic volumes in 1956 were consistently lower than the previous average daily total volumes in 1948. At the other end of the spectrum, the October 1966 counts were very high for certain stations, particularly along Main Street, Seventh and Eighth Avenues.

The Present Traffic Pattern

The 1966 average week-day daily traffic in Bozeman is shown graphically on Figures 8 and 9.

North-South Flows: North Seventh Avenue (U. S. 10) carries the major portion of north-south traffic north of Main Street. Rouse Avenue carries the next to largest amount, about one-half the Seventh Avenue volume, and slightly more than Wallace Avenue. South of Main Street, north-south volumes are highest on South Eighth Avenue, South Willson Avenue, South Church Avenue, and South Eleventh Avenue. At the present time there is not a single north-south crosstown arterial.

East-West Flows: As might be expected, traffic volumes are highest along Main Street through the CBD and around the intersection of Main Street with Seventh Avenue.

Table 1

AVERAGE DAILY TRAFFIC
BOZEMAN

	<u>1948</u>	<u>1953</u>	<u>1956</u>	<u>1960</u>	<u>May</u> <u>1966</u>	<u>Aug</u> <u>1966</u>	<u>Oct</u> <u>1966</u>	<u>Nov</u> <u>1966</u>
<u>CBD STREETS</u>								
<u>Mendenhall Street between</u>								
N. 3rd & Grand Ave.						4,280	5,280	
N. Tracy & N. Black Ave.						4,455	5,188	
N. Rouse & N. Church Ave.						1,660	3,659	
<u>Main Street between</u>								
3rd & Grand Ave.						9,714	21,245	14,798
Tracy & Black Ave.	8,710*	-	7,350*	12,290*	15,412	15,114	12,188	11,771*
Rouse & Church Ave.	6,090	7,120	5,560	9,750	10,288	11,589	11,062	10,246
Bozeman & Rouse Ave.	7,110	9,010	6,660	11,370	-	-	-	-
<u>Babcock Street between</u>								
S. 3rd & S. Grand Ave.						2,433	4,123	
S. Tracy & S. Black Ave.						3,846	6,823	
S. Rouse & S. Church Ave.						1,555	3,177	
<u>Grand Avenue between</u>								
Mendenhall & Main St.						1,803	2,102	
Main & Babcock St.						2,009	3,006	
<u>Willson Avenue between</u>								
Mendenhall & Main St.						3,389	3,796	
Main & Babcock St.						3,630	5,254	
<u>Tracy Avenue between</u>								
Mendenhall & Main St.						3,155	2,732	
Main & Babcock St.						3,538	3,947	
<u>Black Avenue between</u>								
Mendenhall & Main St.						2,358	2,978	
Main & Babcock St.						3,060	4,339	
<u>Bozeman Avenue between</u>								
Mendenhall & Main						1,422	3,213	
Main & Babcock St.						2,330	3,561	
<u>Rouse Avenue between</u>								
Mendenhall & Main St.	1,530	1,930	1,880	2,990	3,465	2,634	4,753	
*between Black and Bozeman								
<u>NORTH-SOUTH STREETS</u>								
<u>Golf Way</u>								
Just S. of Curtiss						845	768	
<u>Church Avenue</u>								
Just S. of the CMSP&P RR.						1,316	941	
Just S. of Kagy Blvd.						695	561	
<u>Wallace Avenue between</u>								
Main & Mendenhall St.						2,044	2,570	
Peach & Fridley St.						1,340	1,547	

Table 1, Continued

	<u>1948</u>	<u>1953</u>	<u>1956</u>	<u>1960</u>	<u>May</u> <u>1966</u>	<u>Aug</u> <u>1966</u>	<u>Oct</u> <u>1966</u>	<u>Nov</u> <u>1966</u>
<u>NORTH-SOUTH STREETS, Cont.</u>								
<u>Rouse Avenue</u>								
Between Peach & Cottonwood St.	1,160	1,050	1,040	2,170	2,515	2,368	3,787	
Just N. of N. city limits	-	630	630	1,990	2,110	2,036	2,901	
<u>Willson Avenue</u>								
Between College & Alderson St.						4,208	8,287	
Between College & Harrison St.						4,010	7,790	
Just S. of Lincoln St.						1,233	851	
Just S. of Kagy Blvd.						706	650	
<u>Tracy Avenue between</u>								
Peach & Short St.						316	1,042	
<u>7th Avenue</u>								
N. of I90 interchange						6,166	6,008	2,321
Just S. of N. city limits	-	3,220	2,350	3,910	6,681	6,408	6,865	6,122
Between W. Peach & W. Aspen St.	3,160	5,410	4,410	6,000	10,012	8,403	9,334	8,167
Between Mendenhall & Main St.	3,360	5,420	5,230	6,590	7,895	7,978	11,310	9,255
<u>8th Avenue between</u>								
Main & Babcock St.	4,340	6,520	-	5,660	-	3,796	12,884	7,511
Koch & Story	3,920	7,160	-	5,540	-	-	-	-
College & Alderson St.	4,340	5,980	4,210	4,950	-	3,716	9,089	7,360
<u>11th Avenue between</u>								
College & Harrison						3,294	5,972	
<u>19th Avenue</u>								
Between Main & Babcock						1,089	1,362	
Just N. of College St.						1,493	1,493	
<u>EAST-WEST STREETS</u>								
<u>Peach Street between</u>								
6th & 7th Ave.						1,572	2,909	
7th & 8th Ave.						817	1,091	
Montana & Rouse Ave.						1,112	1,310	
Just W. of W. city limits								

Table 1, Continued

	<u>1948</u>	<u>1953</u>	<u>1956</u>	<u>1960</u>	<u>May</u> <u>1966</u>	<u>Aug</u> <u>1966</u>	<u>Oct</u> <u>1966</u>	<u>Nov</u> <u>1966</u>
<u>EAST-WEST STREETS, Cont.</u>								
<u>Main Street</u>								
At W. city limits						10,273		
Outside W. city limits						3,674	4,040	
Just W. of 19th Ave.						-	8,372	
Just E. of 19th Ave.						5,138	7,702	
Between 11th & 12th Ave.						10,263	11,779	
Between 7th & 8th Ave.	4,530	7,190	5,860	10,120	15,095	13,911	23,161	15,312
Between 5th & 7th Ave.	5,290	7,310	5,820	11,810	15,383	13,702	22,161	14,778
Between Cypress & McAdow Ave.	1,870*	2,110*	-	4,200*	6,560	6,276	12,728	
Just E. of E. city limits						4,799	3,778	
<u>College Street</u>								
Just W. of 19th Ave.						1,210	1,587	
Between 11th & 12th Ave.	2,150**	-	1,750**	1,670**	-	3,464	4,711	
Between Grand & Willson Ave.						1,166	1,010	
<u>Cleveland Street between</u>								
5th & 6th Ave.						1,307	4,443	
Grand & Willson Ave.						1,411	1,490	
<u>Garfield Street between</u>								
5th & 6th Ave.						936	2,444	
Grand & Willson Ave.						958	1,769	
<u>Grant Street between</u>								
5th & 6th Ave.						1,739	4,103	
Grand & Willson Ave.						1,561	2,691	
<u>Interstate 90</u>								
3/10 mi. W. of W. inter- change								2,726

* 2 blocks E. on Main St. (negligible difference)

** 1 block W. on College

AVERAGE DAILY TRAFFIC-CENTRAL BUSINESS DISTRICT 1966

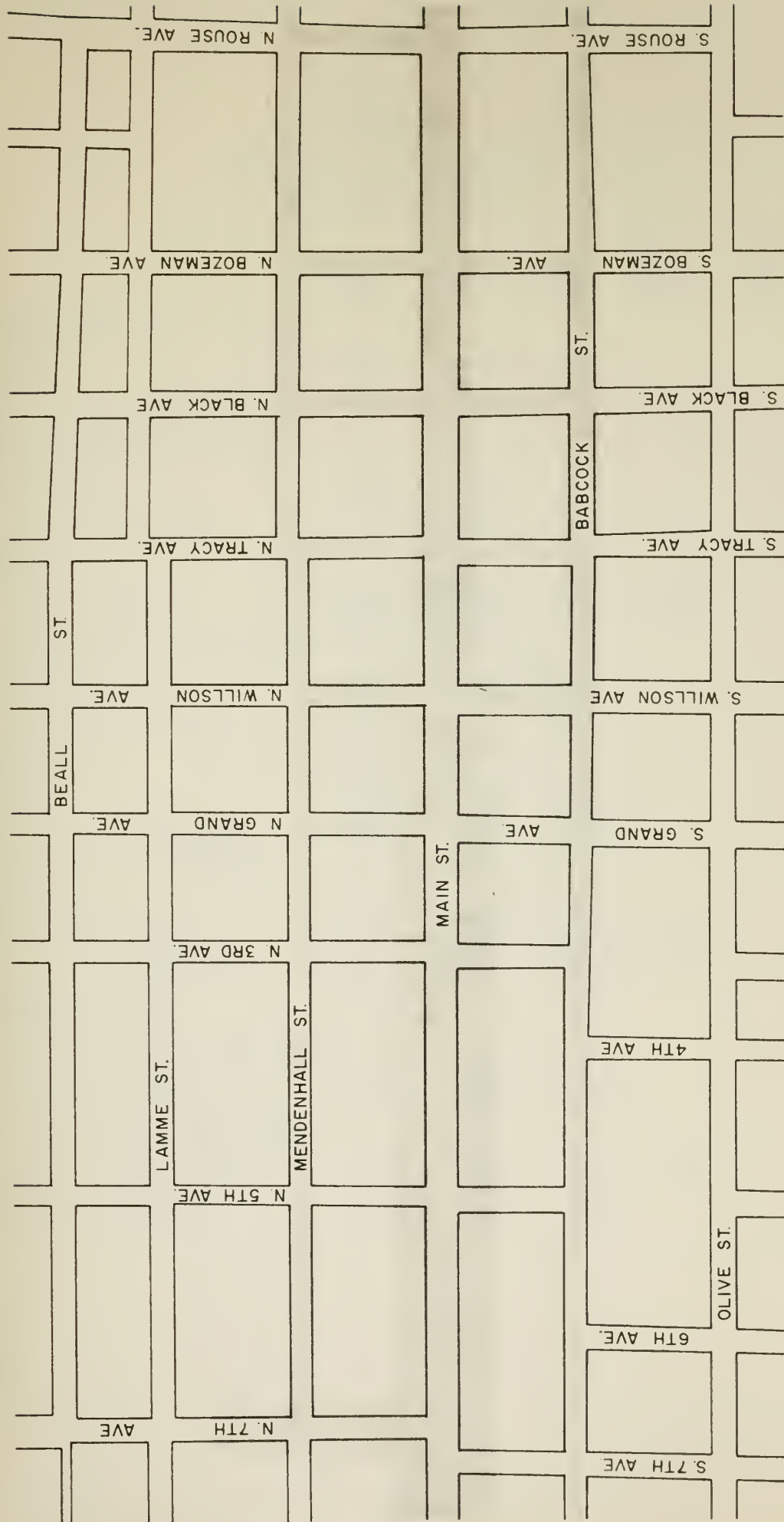


Figure 9

Table 2

AVERAGE DAILY TRAFFIC
OUTSIDE BOZEMAN

	<u>1963</u>	<u>1964</u>	<u>1965</u>	<u>Aug 1966</u>	<u>Oct 1966</u>	<u>Nov 1966</u>
<u>Interstate 90</u>						
E. of Bear Creek inter- change	2,552	2,574	2,620			
W. of North interchange	NA	NA	NA			2,726
<u>Bridger Canyon Road</u>						
At jurisdictional area boundary	297	276	229			
E. of railroad	698	738	879			
N. of NP main line	1,509	1,865	2,300	2,306		
<u>U. S. 10</u>						
E. city limits	3,218	3,212	3,304	4,799		
N. city limits	4,899	5,141	5,597	6,408		
E. of FAS 411 turnoffs	4,136	4,391	4,731			
Between FAS 411 turnoffs	3,627	3,832	4,183			
W. jurisdictional boundary	3,247	3,307	3,692			
<u>FAS 411</u>						
N. of U. S. 10	427	518	515			
1/2 mi. N. of juris- dictional boundary	232	278	270			
<u>191 West</u>						
West city limits	2,446	3,500	4,480			
W. of State Game	2,305	2,380	2,480	3,674		
1 mi. W. of FAS 435	2,079	2,097	2,234			
<u>College Street</u>						
W. city limits	869	823	1,099			
<u>Cottonwood Road (FAS 345)</u>						
At Farmers Canal	346	406	404			
S. of Milwaukee RR	199	313	277			
<u>S. 19th Avenue (FAS 458)</u>						
N. of S. city limits	413	459	510	826		
1 mil S. of above	162	188	209			
S. of Milwaukee RR	112	130	150			

AVERAGE DAILY TRAFFIC 1965

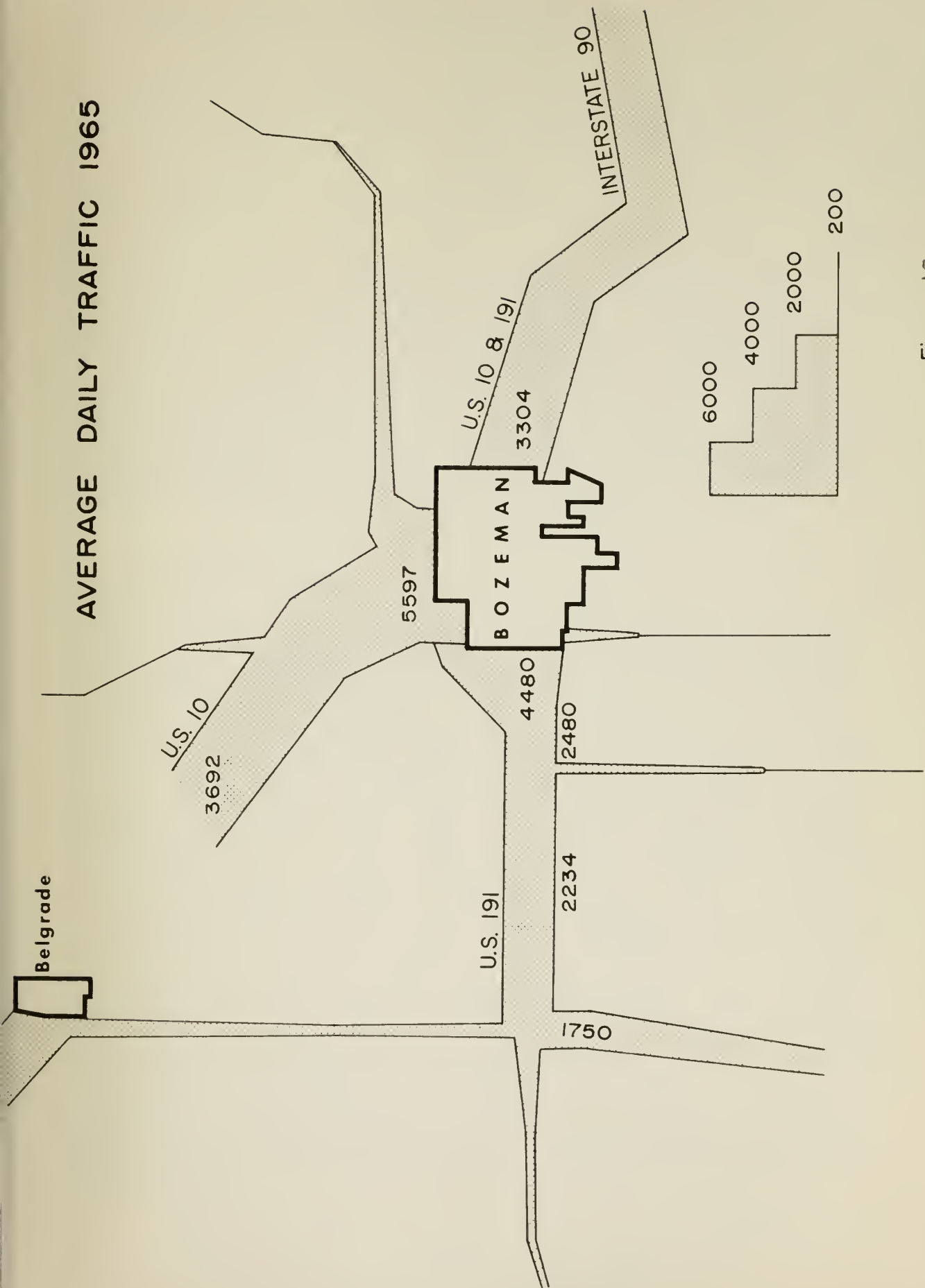


Figure 10

The Present Traffic Pattern, Continued

East-West Flows, continued: Main Street (U. S. 191 and U.S. 10) carries more than double the amount of east-west traffic carried by Mendenhall, the next most heavily traveled east-west arterial. Other east-west arterials are Babcock Street, College Street, and Peach Street. Cleveland, Grant, and Garfield Streets carry relatively high volumes between Montana State University and Willson Avenue. East-west crosstown access is particularly poor south of Main Street. There is no crosstown route between Main Street and Kagy Boulevard. Bozeman Creek and the steep bluff to the east of Sourdough Road have discouraged construction of such a route in the past, but the time is approaching when it will be needed to serve increasing residential development on both sides of Highland Boulevard as well as to provide an alternate crosstown route to the East interchange of Interstate 90. The 1965 volumes for the planning area outside of Bozeman are shown on Figure 10. These describe Bozeman as the open end of a funnel for traffic to and from the south, west, north, and east.

Traffic Flow Changes

Figure 11 shows where increases in traffic have occurred on major routes in the jurisdictional area outside of Bozeman. The largest increase in traffic in and out of the city has occurred on West Main Street (U. S. 191) west of the city. However, since the increase on U. S. 191 west of the intersection of West Main with West College was relatively slight, it is evident that the major portion of the increase is local traffic serving the developing residential area along West Babcock outside the city. The next largest increase outside Bozeman was on U. S. 10, north of Bozeman, reflecting increases in travel between Bozeman and the airport, Belgrade, and the Gallatin Valley as well as through traffic. The increase in volumes on U. S. 10 to the east of Bozeman were much smaller than increases on the same highway northwest of the city. The only other major increase in traffic volume in the jurisdictional area was noted on North Rouse Avenue, the secondary state highway carrying Bridger Canyon traffic to the CBD, U. S. 191, U. S. 10, and Interstate 90 east. Traffic on North Rouse Avenue has more than doubled in the past 13 years. A considerable portion of this increase in traffic can be attributed to the residential development along Bridger Canyon Road in recent years, and to new industrial development along Griffin Drive.

TRAFFIC FLOW INCREASES 1963-1965

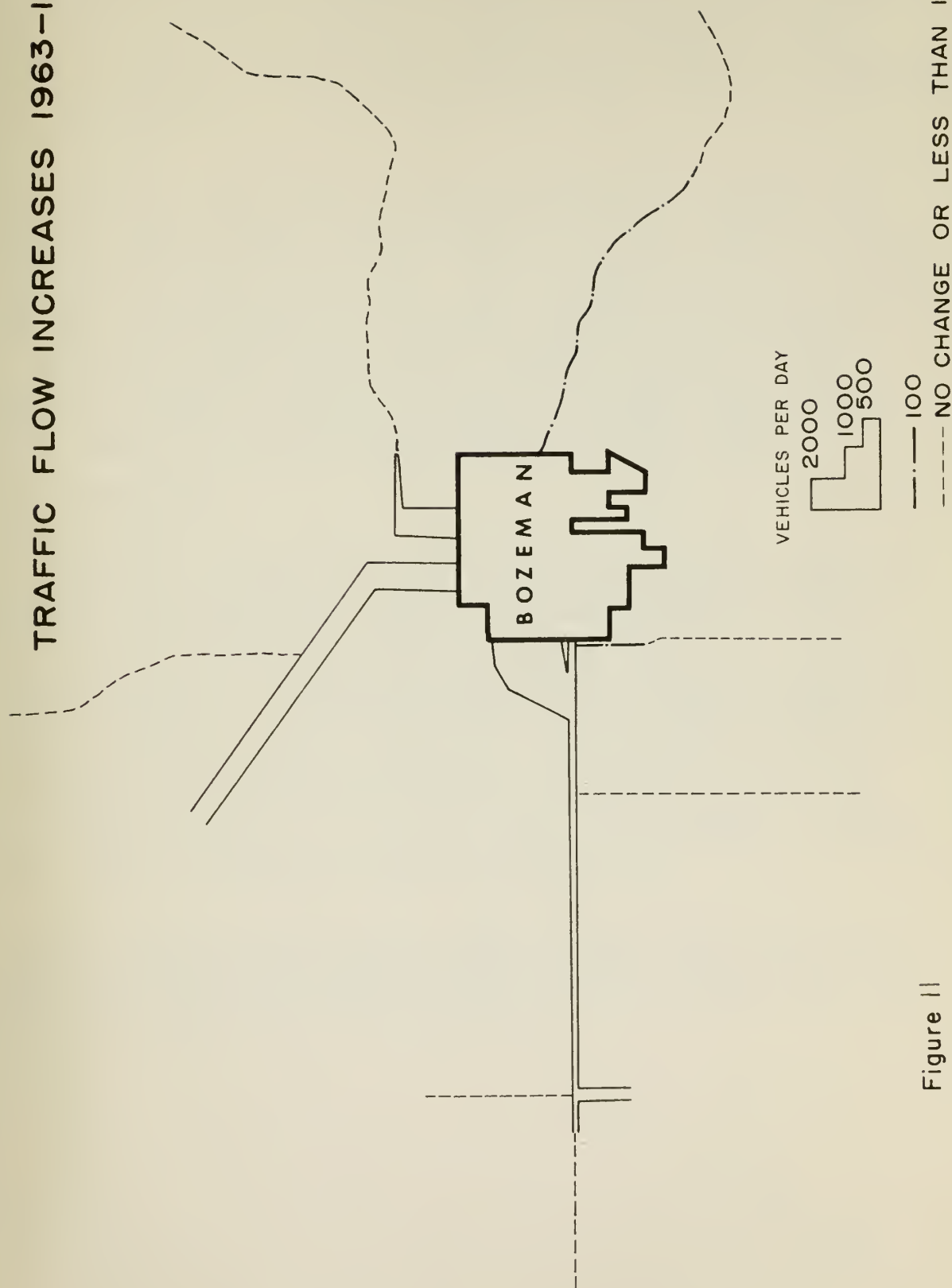


Figure 11

Traffic Flow Changes, Continued

Within the city of Bozeman the major increases illustrated in Figure 12 have been on Main Street west of Seventh Avenue, and on North Seventh Avenue. Both reflect increases noted outside the city on these same streets. Increases in the central business district have not been as large as the increases in the developing business areas along West Main and North Seventh Avenue.

U. S. Highway 191 traffic formerly flowed into Bozeman from the west on College Street and turned north on South Eighth Avenue to Main Street. Even though U. S. 191 traffic is now routed on West Main entirely, traffic volumes on Eighth Avenue are larger today than in 1953, when highway traffic was included. The increase is due almost entirely to increases in University generated traffic. Summer volumes on Eighth Avenue are now lower than 1953 summer volumes, but as the number of summer students increases at Montana State University, summer traffic will again reach the 1953 level.

Street Capacity

Knowledge of the practical working capacity, or the number of vehicles a street can carry in one hour without undue congestion, is necessary to analyze the effectiveness of the present arterial system. The practical working capacities of Bozeman's major streets were determined and are shown on appendix Table 1. The hourly capacity of a street depends upon a number of factors, including street widths, pavement widths, signing, signalization, and other control devices, the density of adjacent land uses, the number of curb cuts for ingress and egress, the provision or prohibition of parking, loading zones, the amount of commercial traffic, whether left turns are allowed at intersections, etc.

Figure 13 compares the present capacities of major Bozeman streets with 1966 peak hour volumes. Areas and intersections where 1966 traffic was over or near capacity during peak load periods are pointed out with clarity.

TRAFFIC FLOW INCREASES
FROM 1960 TO 1966 IN BOZEMAN
(average daily traffic)

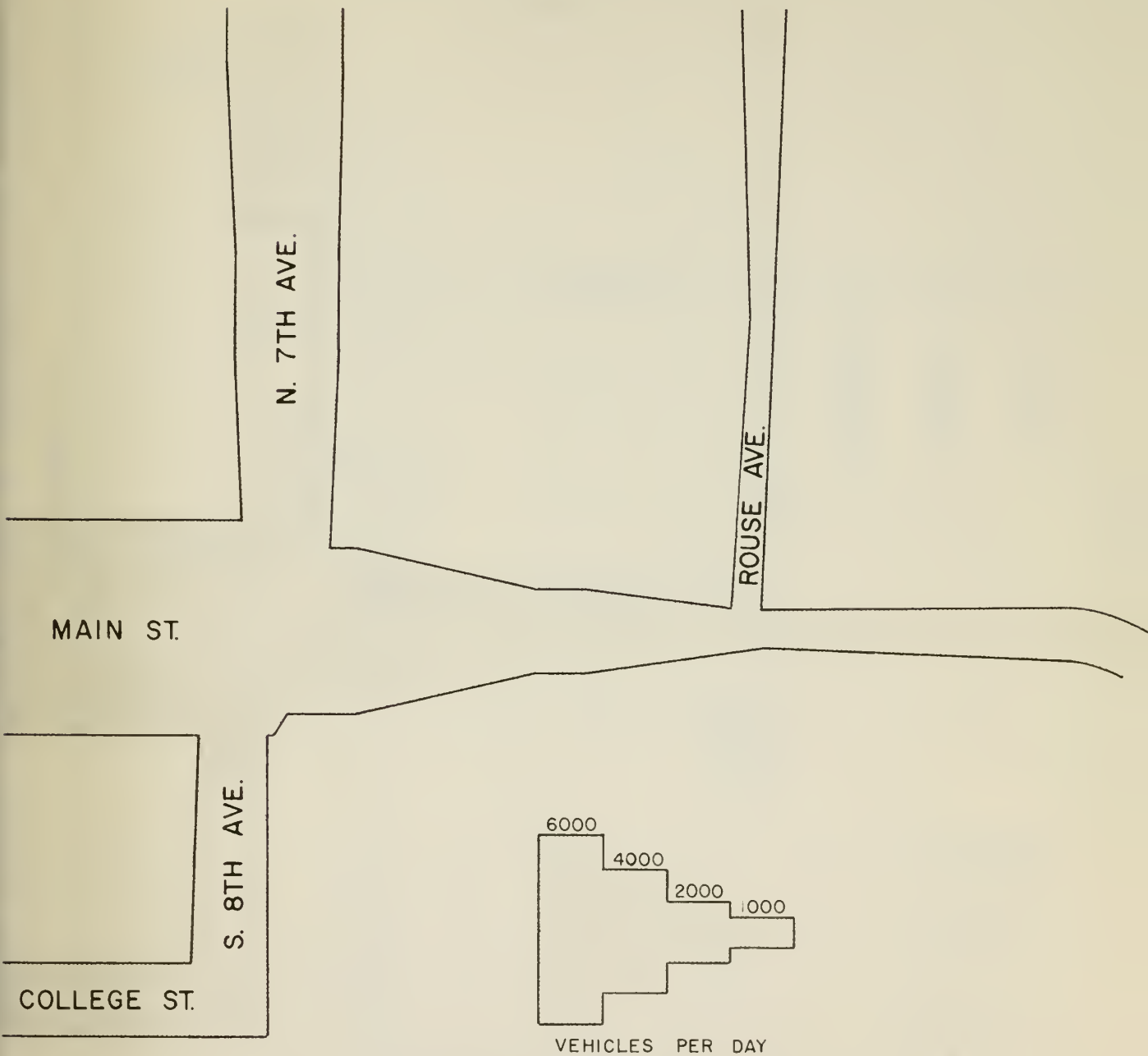


Figure 12

PEAK HOUR VOLUME AS A PERCENT OF CAPACITY

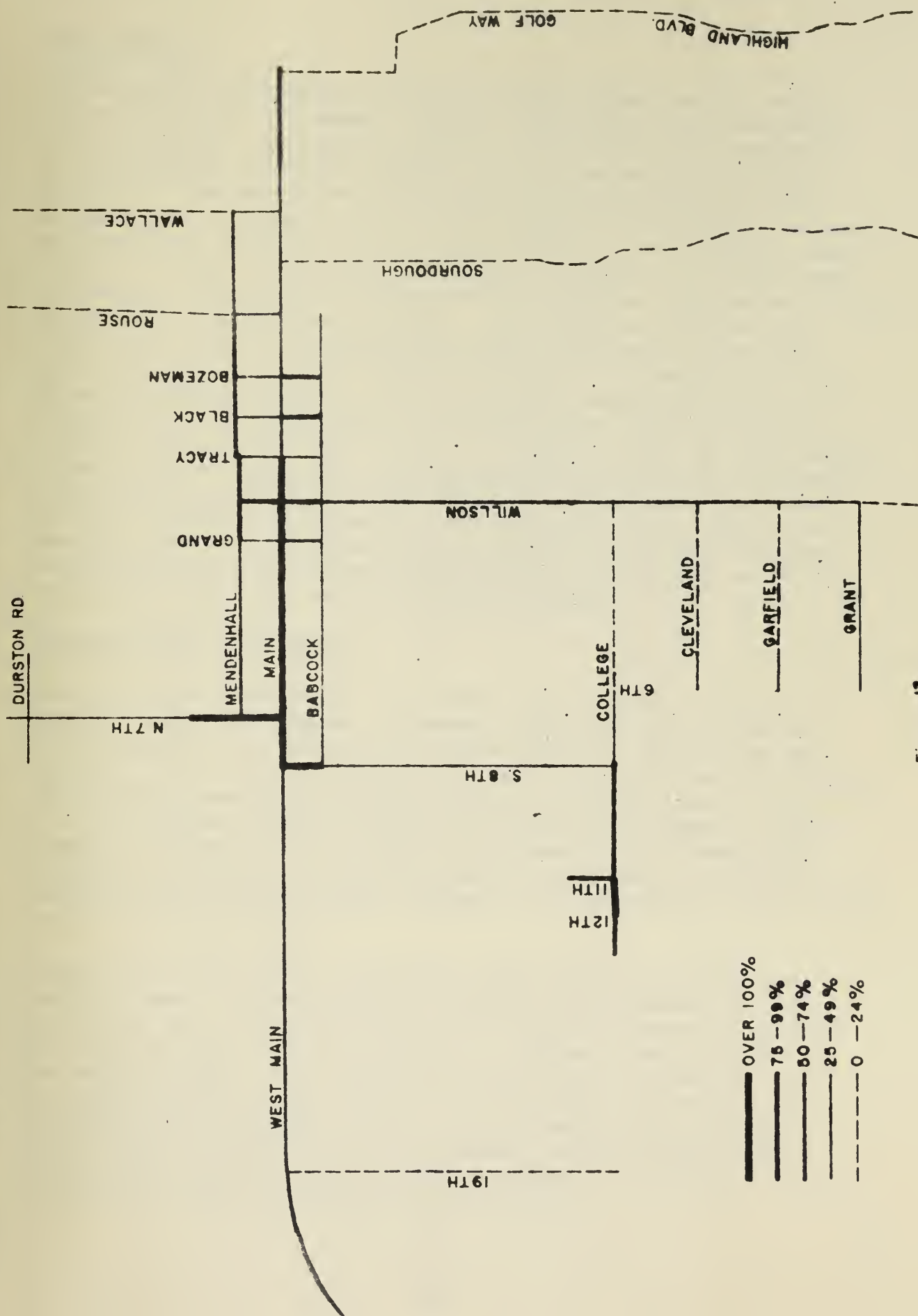


Figure 13

Main Street

The steadily increasing traffic on Main Street is the major traffic problem in Bozeman today. Main Street has been shown to be the major east-west arterial. It is also the center of the central business district so it serves opposing functions, (1) movement of east-west traffic through the city as fast and efficiently as possible, and (2) convenient access to shopping, parking and other activities in the CBD for local traffic. This is a situation similar to that in a great many cities and continues to be one of the greatest sources of traffic congestion problems and hazards. Although the 1953 Highway Department Origin and Destination Study forecasted that Main Street would not be over capacity until 1970, peak hour volumes are already above practical working capacity today. Although there is considerable variation from block to block, traffic volumes are high along the entire length of Main Street between Rouse and Eighth Avenues. The intersection of Seventh Avenue and Main Street is the busiest in the city, and adds to Main Street's problems because so much of the traffic on Seventh Avenue is turning onto or off Main Street. The highest volumes in the city are recorded for the blocks on Main Street both east and west of Seventh Avenue.

Montana State University

Montana State University is a major contributor to present traffic flows in Bozeman. Present traffic flows to and from the University are primarily concentrated on three arterial routes, (1) Willson Avenue from Kagy Boulevard to Main Street, (2) Eighth Avenue from College Street to Main Street, and (3) the Eleventh-Tenth Avenue arterial from College to Main Streets. East-west flows are mainly confined to movements from the University to Willson Avenue on College, Cleveland, Garfield, and Grant Streets through the residential area located east of the University.

Many student vehicles are parked along streets in this residential area, and usurp parking spaces which should be left for local use. This practice reduces the residential quality of the area and is also hazardous. Adequate parking areas on campus should be provided to relieve this situation. If this is not done, the residents have a right to demand the enactment and enforcement of a no-daytime-parking ordinance which would increase friction between "town and gown" and add to the inconvenience of many students. The present situation is not fair to neighborhood residents.

Future Traffic Volumes

Since a land use plan has not been prepared for the Bozeman planning area, future traffic volumes could not be projected on the basis of the allocation of future land use. Further, no origin or destination data are available to indicate internal traffic movements within Bozeman. The 1953 Urban Area Traffic Study of Bozeman, conducted by the Montana Highway Commission, gives some clues to desired destinations of incoming traffic, but does not reflect internal trips from one area of Bozeman to another. Rough estimates of future traffic on the existing road system in Bozeman were made, based on a Montana Highway Commission formula and modified in regard to past trends on arterials in the jurisdictional area, Highway Commission projections of the amount of through traffic that will be removed from Bozeman streets by the freeway, and Highway Commission forecasts of traffic on North Seventh and East Main at the East and West interchanges with Interstate 90. Peak hour traffic volumes for 1985 were estimated at 15 percent of average daily traffic, and compared to existing street capacities. The arterial plan was then developed to provide a system that would relieve overloaded streets, carry the volumes expected by 1985 and beyond, and improve the all over accessibility patterns within the planning area. Particular attention was given to those areas where future development is expected by 1985.

Auto Ownership

Future traffic will be affected by the number of cars owned and their use. The following table shows the number of persons per vehicle in Montana is much lower than for the United States, indicating that the per capita rate of car ownership in Montana is higher than the national average.

POPULATION PER VEHICLE REGISTRATION

	<u>1950</u>	<u>1955</u>	<u>1960</u>
United States	3.1	2.6	
Montana	2.3	1.9	1.65
Gallatin Co.			1.65

A continuation of recent trends would indicate about 1.2 persons per vehicle would be reached in Gallatin County by 1980. This estimate would yield a total of 34,000 vehicles in the county in 1980, more than double the number in 1960. Of this total, 19,200 vehicles would be in the city of Bozeman.

The ownership of vehicles will, of course, add to the traffic burden. This increase will be somewhat compounded by an unknown increase in the use of each car. National data indicate that mobility is increasing and with improved accessibility, and the concomitant expansion of urban areas, the number and length of trips each car will make will also increase.

Figure 14 illustrates the results of assigning estimated 1985 traffic volumes on the 1966 street system in Bozeman. The 1985 volumes were adjusted to reflect the traffic removed from city streets by the completion of Interstate 90.

The areas of future congestion problems for which the arterial plan must recommend solutions are clearly indicated. The central business district, the entire length of Main Street, the Montana State University area, and portions of Seventh and Eighth Avenues are brought into focus as major problem areas.

Arterial Classification

The street system should serve the varied land uses within the planning area and insure logical community development. This will involve a combination of various functional street types into an overall plan. This plan should provide for the division of streets into systems according to their purpose: for movement or for access - and integrate these systems into a coordinated network.

The arterial plan classifies all streets and roads according to the transportation and service function they perform, as follows:

Freeway:

Provides for efficient movement of large volumes of through traffic between communities and regions; does not provide access to adjacent land uses; provides one additional classification to those proposed in the Gerckins report.

BOZEMAN ARTERIAL STREETS OVER 100% CAPACITY AT PEAK HOUR, 1985*

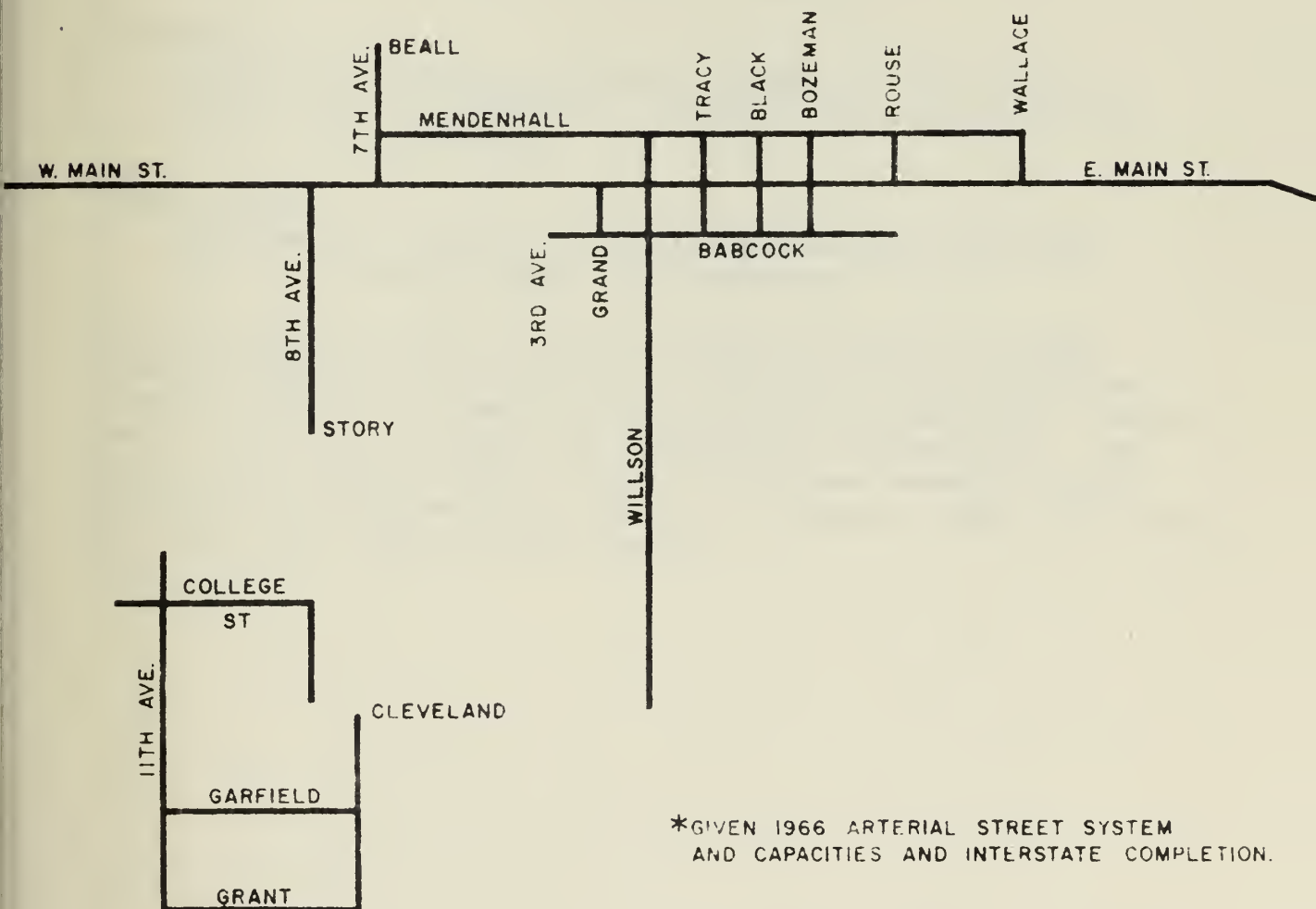


Figure 14

Arterial Classification, Continued

Primary Arterial:

Provides for through traffic movement to and around the city and connects major highways and freeways.

Community Arterial:

Provides for expeditious movement within and through the planning area for cross-town traffic in Bozeman and for circulation between areas inside the city; it also provides access to abutting property.

Collector:

Provides for traffic movement between arterials and between local streets and arterials and provides access to abutting property.

Local Street:

Provides for access to abutting properties and local traffic movement within a neighborhood.

The end product of this street classification is a street network integrated to provide satisfactory traffic circulation and access to commercial and industrial districts, schools, parks, residential areas, and neighboring communities. To provide the greatest efficiency and the best service, some streets are functionally oriented to movement, others to access, and some serve both of these needs.

APPENDIX A

Primary Arterials

The following streets are designated Primary Arterials on the Arterial Plan:

U. S. 191 (Main Street) from west jurisdictional limits to East Interchange

U. S. 10 West (North Seventh Avenue) from northwest jurisdictional limits to Main Street

Inner Ring Road:

Kagy Boulevard from South Nineteenth Avenue to the Bear Creek Interchange

Nineteenth Avenue from Kagy Boulevard to Oak Street

Oak Street from Nineteenth Avenue to Third Avenue

Third Avenue from Oak Street to Tamarack Street

Tamarack Street from Third Avenue to Wallace Avenue

Wallace Avenue from Main Street to "L" Street

"L" Street from Wallace to Bridger Canyon Road

Bridger Canyon Road from "L" Street to east jurisdictional limits

Alternate U. S. 191 from west jurisdictional limits at Goochill Road to Kagy Boulevard

Community Arterials

The following streets are designated Community Arterials on the Arterial Plan:

Valley Center Road from west jurisdictional limits to U. S. 10

Northern Outer Ring Road:

New road from U. S. 10 at freeway underpass to Bohart Road at Springhill Road

Bohart Road from Springhill Road to "L" Street at Bridger Canyon Road

Western Outer Ring Road:

McGinley Road from Valley Center Road to Peg Smith Road

Peg Smith Road from McGinley Road to Cottonwood Road

Cottonwood Road from Peg Smith Road to south jurisdictional limits

Griffin Road from U. S. 10 to Rouse Avenue

Durston Road from Love Lane to Wallace Avenue

Mendenhall Street from Eighth Avenue to Wallace Avenue

Babcock Street from Eighth Avenue to Wallace Avenue

College Street from U. S. 191 to Highland Boulevard via Harrison east of South Church Avenue

APPENDIX A, CONTINUED

Community Arterials, Continued

Old U. S. 10 from East Interchange to Bear Creek Interchange
I 90

Stucky Lane from Goochill Road to Nineteenth Avenue
Goochill Road from Alternate U. S. 191 to Stucky Lane
Springfield Road - FAS 411 - from north jurisdictional
limits to U. S. 10

Hyalite Road from south jurisdictional limits to Kagy
Boulevard

Eighth Avenue from Main Street to College Street

Sixth Avenue from Grant Street to Main Street

Seventh Avenue from Kagy Boulevard to Grant Street

Grant Street from Seventh Avenue to Sixth Avenue

South Willson Avenue from Mendenhall to Third Avenue
South Road

Third Avenue South Road from Willson to Patterson Siding
Road

Patterson Siding Road from Third Avenue South Road to
Hyalite Road

Rouse Avenue, Babcock Street to "L" Street at Bridger
Canyon Road

Church Avenue, Babcock Street to Mendenhall Street

Church Avenue, Sourdough Road from south jurisdictional
limits to Story ~~ye~~ Street

Wallace Avenue from Main to Story Street at Church
Avenue

Highland Boulevard from Kagy Boulevard to U. S. 10

Bear Canyon Road from Old Yellowstone Trail Road to
south jurisdictional limits

Davis Road from U. S. 10 to Kelly Canyon Road

Kelly Canyon Road from Davis Road to Bridger Canyon Road

Collector Streets

The following streets are designated Collector Streets on the
Arterial Plan:

Love Lane from U. S. 191 to north jurisdictional limits

Goochill Road from Stucky Lane to U. S. 191

Rea School Road from U. S. 191 to Durston Road

Ferguson Road from U. S. 191 to Durston Road

Fowler School Road from south jurisdictional limits
to Stucky Lane

Westlake Lane from U. S. 191 to Valley Center Road

APPENDIX A, CONTINUED

Collector Streets, Continued

North Nineteenth Avenue from Oak Street to Westlake Lane

Fifteenth Avenue from Kagy Boulevard to Oak Street

Eleventh Avenue from College Street to Babcock

from Main Street to Durston Road

from Stucky Lane to Lincoln Street

South Seventh Avenue from Kagy Boulevard to Stucky Lane

Grand Avenue from Babcock Street to Mendenhall Street

Black Avenue from Babcock Street to Mendenhall Street

Bozeman Avenue from Babcock Street to Mendenhall Street

Tracy Avenue from Babcock Street to Tamarack Street

Church Avenue from Storey Street to Babcock

Truck Route:

Broadway from Main Street to Avocado

Avocado from Broadway to Front Street

Front Street from Avocado to Tamarack Street

Tamarack Street from Wallace Avenue to Front Street

Manley Lane from Bohart Road to Griffin Drive

I 90 Frontage Road from Highland Boulevard to Ellis Street

from Ellis Street to Lillard Road

Ellis Street from Highland Boulevard to Old Yellowstone

Trail Road

Lillard Road from Kelly Canyon Road to one mile south

of Old Yellowstone Trail Road

Williams Road from Old Yellowstone Trail Road south for

one and one-half miles

Moffitt Canyon Road from U. S. 10 to east jurisdictional
limits

Rundlett Road from north jurisdictional limits to McGinley
Road

Baxter Lane from west jurisdictional limits to U. S. 10
at West Interchange I 90

Griffin Drive from Rouse Avenue to "L" Street

Babcock Street from Ferguson Road to Eighth Avenue

Kelly Canyon Road from U. S. 10 to Davis Road

Garfield Street from South Seventeenth Avenue to South
Eleventh Avenue

From South Sixth Avenue to Sourdough Road

Grant Street from South Sixth Avenue to South Willson

Lincoln Street from South Nineteenth Avenue to South
Fifteenth Avenue

Stucky Lane from Hyalite Road to South Willson Avenue

APPENDIX A, CONTINUED

Collector Streets, Continued

Road from South Willson Avenue to Sourdough Road south
of golf course

Goldenstein Road from Third Avenue South Road to Sour-
dough Road

Matthews Siding Road from Cottonwood Road to Hyalite
Road

Leverich East Road from Hyalite Road to Sourdough Road

APPENDIX TABLE 1

PRACTICAL WORKING CAPACITY MAJOR STREETS IN BOZEMAN 1966

Street	Right- of-way width	Pave- ment width	Capacity in vehicles/ hour	Peak Hour	
				Volume	Percent capacity
<u>Durston Road-Peach Street</u>					
(West city limits to Wallace Avenue)					
N. 19th to N. 8th	60	37	1,700		
N. 8th to N. 6th	60	37	850	318	37.4
N. 6th to Montana	60	37	1,700		
Montana to Rouse	60	37	850		
Rouse to Church	60	unpaved			
Church to Wallace	60	unpaved			
<u>Mendenhall</u>					
5th to 7th	53	38	1,140		
3rd to 5th	60	45	1,458		
3rd to Tracy	60	40	620	583	94.0
Tracy to Rouse	60	41	642	587	91.0
Rouse to Wallace	60	41	642	338	52.4
<u>Main Street</u>					
W. city limits to 15th	100	36	1,488	923	62.0
N. 15th to N. 8th	110	63	2,025	1,204	59.4
N. 8th to N. 7th	110	63	1,612	2,227	138.2
N. 7th to Tracy	90	63	1,935	2,207	113.9
Tracy to Rouse	93	63	1,935	1,284	66.3
Rouse to Wallace	93	63	1,935	1,200	62.0
Wallace to Broadway	93	66	2,025		
Broadway to city limits	90-140-75	33	1,320	1,037	78.6
<u>Labcock Street</u>					
(From S. 8th to Church)					
S. 8th to S. 7th	60	37	1,087		
S. 7th to Grand	60	37	1,087	387	35.8
Grand to Willson	60	42	1,308		
Willson to Tracy	60	48	1,586		
Tracy to Black	60	47	1,543	692	44.8
Black to Bozeman	60	40	1,242		
Bozeman to Rouse	60	38	1,137		
Rouse to Church	60	41	1,286	331	25.7
<u>College Street</u>					
(S. 15th to Willson Ave.)					
S. 15th to 12th	60	23	980		
12th to 11th	60	23	450	606	134.7
11th to 8th	60	42	670		
8th to Grand	60	29	1,250		
Grand to Willson	60	29	670	123	18.3

APPENDIX TABLE 1, CONTINUED

Street	Right- of-way width	Pave- ment width	Capacity in vehicles/ hour	Peak Hour	
				Volume	Percent capacity
<u>Cleveland Street</u>					
(S. 6th to Willson)					
6th to Grand	60	29	1,242	480	38.6
Grant to Willson	60	29	621	169	18.4
<u>Garfield Street</u>					
6th to 5th	60	33	737	243	33.0
6th to Grand	60	33	1,474		
Grand to Willson	60	33	737	182	24.7
<u>Grant Street</u>					
6th to Grand	60	37	1,706	533	31.0
Grand to Willson	60	37	853	339	39.7
<u>Kagy Boulevard</u>					
11th to 5th	45	25	1,050		
5th to Willson	90	25	1,050		
Willson to Bozeman Creek	90	unpaved	1,050		
Bozeman Creek to Sourdough Road	90	unpaved	525		
Sourdough Road to Highland Boulevard	44	unpaved	525		
<u>"L" Street</u>					
Juniper to north city limits	60	unpaved	950		
<u>19th Avenue</u>					
Main to Babcock	60	39	910	177	19.5
Babcock to (Alderson)	60	39	1,820		
(Alderson) to College	60	39	910	209	23.0
College to (Jefferson)	60	31	679		
Jefferson to Kagy Blvd.	60	31	1,358		
<u>15th Avenue</u>					
Durston Road to (Menden- hall)	60	37	1,706		
(Mendenhall) to Main	60	37	853		
<u>11th Avenue</u>					
Peach to Beall	80	45	2,130		
Beall to Mendenhall	100-110	45	2,130		
Mendenhall to Main	117	45	1,065		
S. Curtis to Alderson	60	37	1,706		
Alderson to College	60	37	853	647	75.8
College to Kagy Blvd.	60	37	853		
<u>South Eighth (Main to College)</u>					
Main to Babcock	88	61	1,032	1,314	127.3
Babcock to Nickerson	88	61	2,734		
Dickerson to College	88	61	2,150	770	35.8

APPENDIX TABLE 1, CONTINUED

Street	Right- of-way width	Pave- ment width	Capacity in vehicles/ hour	Peak	Hour
				Volume	Percent capacity
North Seventh					
Oak to Tamarack	130	89	2,630		
Tamarack to Beall	100	89	2,630	790	30.0
Beall to Mendenhall	57	57	2,436		
Mendenhall to Main	57	57	1,218	1,068	88.4
Sixth Avenue					
College to Cleveland	60	33	1,474		
Cleveland to Hayes	60	28	1,184		
Hayes to Grant	60	28	592		
Third Avenue					
Mendenhall to Main	52	42	990		
Main to Babcock	60	40	940		
Grand Avenue					
Mendenhall to Main	52	41	642	238	36.9
Main to Babcock	60	42	664	349	52.6
Willson Avenue					
Mendenhall to Main	52	36	518	490	94.6
Main to Babcock	80	60	1,017	669	78.7
Babcock to Koch	80	48	2,280		
Koch to Alderson	80	44	2,080		
Alderson to Cleveland	80	45	2,130	884	65.8
Cleveland to Garfield	80	33	1,474	802	54.4
Garfield to Grant	80	45	2,130		
Grant to Kagy	80	46	2,180	87	4.0
Tracy Avenue	52	38	1,764		
Beall to Mendenhall	45-49-51	38	882		
Mendenhall to Main	58	39	910	293	32.2
Main to Babcock	57	45	1,065	381	35.8
Black Avenue					
Mendenhall to Main	56	39	595	341	57.3
Main to Babcock	57	38	570	454	79.6
Bozeman Avenue					
Mendenhall to Main	57	38	570	377	66.1
Main to Babcock	57	42	662	474	83.2
Rouse Avenue					
(North city limits to Babcock)					
N. City limits to Birch	60	48	2,280	294	12.9
Birch to Tamarack	60	36	1,648		
Tamarack to Peach	60	49	2,330		
Peach to Davis	60	41	1,930	422	21.9
Davis to Beall	60	39	1,830		

APPENDIX TABLE 1, CONTINUED

<u>Street</u>	<u>Right- of-way width</u>	<u>Pave- ment width</u>	<u>Capacity in vehicles/ hour</u>	<u>Peak Hour</u>	
				<u>Volume</u>	<u>Percent capacity</u>
<u>Rouse Avenue, continued</u>					
Beall to Lamme	62	41	1,285		
Lamme to Mendenhall	62	42	1,328		
Mendenhall to Main	66	46	750	497	66.3
Main to Babcock	60	43			
<u>Church Avenue</u>					
Mendenhall to Main	60	33	442		
Main to Babcock	60	37	543		
Babcock to Olive	60	32	708		
Olive to Story	60	32	1,416		
Story to Kagy Blvd.	60	23	980	100	10.2
<u>Wallace Avenue</u>					
Tamarack to Mendenhall	60	33	1,474	143	9.7
Mendenhall to Main	60	33	737	266	36.1
<u>Cypress Avenue</u>					
E. Main to Babcock	60	37	544		
E. Babcock to E. Curtiss	60	37	1,087		
<u>East Curtiss</u>					
Cypress to Golf Way	60	37	1,087		
<u>Golf Way - Highland Blvd.</u>					
Curtiss to College	60	22	1,087	124	11.4
College to Holly	90	22	930		
Holly to Kagy Blvd.	90	25	1,030		

APPENDIX B

The Arterial Plan proposals will require expenditures by the State, the County and the City. Following is a list of major improvements proposed in the plan and classified by responsibility for financing.

SUMMARY OF ARTERIAL ROAD PLAN IN TERMS OF CAPITAL IMPROVEMENTS

STATE PROJECTS

STATE ROAD IMPROVEMENTS COMMITTED

Main Street

Widen Main Street from Broadway to east interchange.

Interstate Frontage Road

Improve Interstate Frontage Road from Ellis Street to U. S. 10.

Frontage Road

Improve old U. S. 10 to connect with Moffit Canyon Road.

OTHER STATE PROJECTS FOR CONSIDERATION

A. Seventh Avenue

Widen Seventh Avenue from Beall Street to Main Street.

B. Connection of Seventh to Eighth Avenues

1. Acquire right-of-way and construct connection of Seventh to Eighth from Mendenhall to Main. One-way signing.

C. Connection of Sixth to Seventh Avenue - Babcock to Main (one way couplet)

1. Acquire right-of-way and construct connection of Sixth Avenue to Seventh, from Babcock to Main. One-way signing.

APPENDIX B, CONTINUED

D. One Way Couplet - Mendenhall and Main

1. Signalization and one-way signing:
Mendenhall from Church to Seventh
Babcock from Eighth to Church
Seventh from Main to Mendenhall
Eighth from Main to Babcock
Church from Babcock to Main

E. Oak Street and Nineteenth Avenue By-pass to Kagy Boulevard

1. Acquire additional right-of-way and construct Oak Street from Seventh to Nineteenth.
2. Acquire additional right-of-way and construct Nineteenth from Oak to Kagy Boulevard.

F. Kagy Boulevard by-Pass Nineteenth to the Bear Creek Interchange

1. Acquire right-of-way, widen or improve access route from Nineteenth Avenue to the Bear Creek Interchange on the freeway via the Old Yellowstone Trail Road.

G. Kagy Boulevard to the West (Alternate U.S. 191)

1. Acquire right-of-way and construct Kagy Boulevard extended to the west of Nineteenth in a southwesterly direction to the county road which crosses Dry Middle Creek as an alternate to U.S. 191 from Gallatin Gateway.

APPENDIX B, CONTINUED

CITY IMPROVEMENTS

A. College Street

1. Widen College Street from Eighth Avenue to Bozeman Avenue:

- Acquisition
- Engineering
- Tree Replacement
- Improvement

2. Improvement from Bozeman to Church Street:

- Right-of-way acquisition
- Engineering
- Construction

3. Improvement of College from Church Avenue to Ellis Street (via Harrison Street):

- Right-of-way acquisition
- Engineering
- Construction

B. Fifteenth Avenue Collector

1. Improvement of the Fifteenth Avenue Collector Street from College to Main:

- Right-of-way acquisition
- Engineering
- Improvements

C. Highland Boulevard Improvement

1. Improvement of Highland Boulevard from Harrison to East Main (U. S. 10):

- Right-of-way acquisition
- Engineering
- Construction

D. Eleventh Avenue Collector

1. Improvement of the Eleventh Avenue Collector Street from Curtis to Babcock:

- Additional right-of-way
- Engineering
- Construction

APPENDIX B, CONTINUED

E. South Willson Avenue

1. To widen the narrow portion of South Willson between College and Garfield:

Right-of-way acq.
Construction

F. Tamarack-Broadway Truck Route

This project would include the improvement of Tamarack from Third to Front, including Front Street to Avocado, Avocado to Broadway, Broadway to Main:

Engineering
Right-of-way acq.
Construction

G. Garfield Street Collector

Extend Garfield Street from Tracy to Sourdough Road:

Acquisition of right-
of way
Engineering
Construction

H. Wallace Avenue Community Arterial

Provide the connection of Wallace Avenue to Church Avenue just north of the Milwaukee Railroad:

Acq. of right-of-way
Engineering
Construction

I. "L" Street Primary Arterial

To construct the overpass of the Northern Pacific Railroad tracks from Pear Street to Wallace Avenue including contacting the railroads for their possible participation:

Engineering studies
Right-of-way acq.
Construction

APPENDIX B, CONTINUED

J. One-Way Couplet Eighth and Sixth Avenues

1. Signing of Sixth and Eighth from Babcock to Harrison.
2. Signing of Harrison Street from Eighth to Sixth Avenue.

CITY AND COUNTY PROJECTS

The following projects should be carried out in cooperation between the city and the county.

A. Oak Street Primary Arterial

Oak Street widening and improvement from Third to Seventh Avenues:

Right-of-way acq.
Engineering
Construction

B. North Third Avenue Widening and Improvement

Widen and improve North Third Avenue from Oak Street to Tamarack:

Right-of-way acq.
Engineering
Construction

C. North Fifteenth Avenue Collector

Improvement from Durston Road to Oak Street:

Right-of-way
Engineering
Construction

D. Sourdough Road

Widen from Babcock to Kagy Boulevard:
Engineering
Construction

APPENDIX B, CONTINUED

COUNTY ROAD IMPROVEMENT PROJECTS

A. FAS 345 Improvements

1. Extend Cottonwood Road (FAS 345) north-
erly for one mile to connect with Peg Smith
Road at Durston Road:

Right-of-way acq.
(dedication)

Engineering
Construction

2. Connection between Peg Smith Road and
McGinley Road to connect to the freeway
underpass (outer ring road):

Acq. or dedication
right-of-way

Engineering
Construction

B. South Willson Avenue

The removal of two jogs south of the city
limits between S. Willson and Third Avenue
South Road and between Third Avenue South
Road and Patterson Siding Road:

Acq. right-of-way

Engineering
Construction

C. Northern Ring Road (Connection of FAS 411)

Connection between Bohart Road at FAS 411 with
Valley Center Road at the freeway underpass.

Right-of-way acq.
(dedication)

Engineering
Construction

D. "L" Street Primary Arterial

The upgrading and paving of "L" Street from
Bear Street to Bridger-Canyon Road:

Right-of-way acq.
(dedication)

Engineering
Construction

APPENDIX B, CONTINUED

NOTE: The next three projects involve Montana State University.

E. The Eleventh Avenue Collector

Extension of Eleventh Avenue southerly for one-quarter mile south of Kagy Boulevard (MSU).

F. Seventh Avenue

1. Community arterial - construction of Seventh from Grant to Kagy Boulevard.
2. Collector - the southern extension for one-quarter mile south of Kagy Boulevard (MSU).

G. New Road South of Kagy Boulevard

An extension of Stucky Lane to the east to S. Willson Avenue (MSU and county).

H. New Collector South of Golf Course

A new road between S. Willson and Sourdough Road south of the golf course.

I. North Nineteenth - Frontage Road Collector

Northerly extension of Nineteenth from Oak to south side of freeway, and then northwest as Frontage Road to connect with existing frontage road.

J. North-South Collector

New road to the north from U.S. 191, and located one mile west of Nineteenth.



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